thermogenesis®

ThermoLine™ Thawers

Warm Water Baths
for Thawing Blood Products

Operator & Service Manual

Models: MT202 (software version 2.1)
MT204 (software version 2.2)
MT210 (software version 2.1)

CE

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Table of Contents

Chapter 1 – INTRODUCTION

Intended Use 1-1
Symbols Key 1-1
Text Conventions 1-2
Electrical Safety 1-3
Cautions And Safety Instructions 1-3
Copyright Notice 1-5
Trademarks 1-5
Disclaimer 1-5
Help Line 1-6
European Union Authorized Representative 1-6
Limited Warranty 1-6
Warranty 1-6
Procedure 1-7
Limitations 1-7

Chapter 2 – OVERVIEW

System Summary 2-1
Specifications 2-1
Component Layout 2-2
Component Functions 2-2

Chapter 3 – INSTALLATION

Unpacking and Inspection 3-1
Installation 3-2
Filling The Reservoir – MT202 and MT204 3-3
Filling The Reservoir – MT210 3-4
Overfilling 3-5
Overfilling – MT202 & MT204 3-5
Overfilling – MT210 3-6
Completing The Installation 3-7

Table of Contents

Chapter 4 – OPERATION

Introduction 4-1
Operational Input Codes 4-1
Thawing Blood Components 4-2
Operating a Thaw Cycle 4-3
Interrupting a Thaw Cycle 4-3
Resetting the Thaw Cycle Time 4-3
Operating Temperature/Error Message Display 4-4
Error Messages 4-4
Resetting the Operating Temperature 4-5

Chapter 5 – MAINTENANCE

Preventive Maintenance 5-1
Decontamination 5-1
Removing and Replacing a Pocket 5-3
Repairing a Pocket 5-4
Draining the Thawer — MT202 & MT204 5-5
Draining the Thawer — MT210 5-6
Verification of Operating Temperature 5-8
Calibration of Operating Temperature 5-9
Verification of Overtemp Error Code 5-10

Chapter 6 – TROUBLESHOOTING

Introduction 6-1
Mechanical Problems 6-1
Unit not Heating 6-2
Power Surges 6-2
Radio Frequency Interference 6-2
Unit Overheating (Overtemp) 6-2
Unit not Filling 6-3
Unit not Draining — MT204 6-3
Unit not Circulating — MT210 6-4
Low Fluid Level 6-4
No Agitation 6-5

Chapter 7 – SERVICING THE THAWERS

Verification After Servicing Thawers 7-1
Servicing the Thawers – MT202..... 7-1
Servicing the Thawers – MT204..... 7-4
Servicing the Thawers – MT210..... 7-7

Chapter 8 – PARTS LIST

Parts List – MT202 8-1
Parts List – MT204 8-2
Parts List – MT210 8-3

Chapter 9 – REFERENCE DRAWINGS

Drawings – MT202 9-1
Drawings – MT204 9-5
Drawings – MT210 9-11

Chapter 1
Introduction

TABLE OF CONTENTS

Intended Use 1-1

Symbols Key 1-1

Text Conventions 1-2

Electrical Safety 1-3

Cautions And Safety Instructions 1-3

Copyright Notice 1-5

Trademarks 1-5

Disclaimer 1-5

Help Line 1-6

European Union Authorized Representative 1-6

Limited Warranty 1-6

Warranty 1-6

Procedure 1-7

Limitations 1-7

Intended Use

The THERMOGENESIS CORP. Thawers are intended for the fast, efficient thawing of blood and blood components.

This Operator Manual is organized to provide easy access for set-up and operations information for the Thawers. **Please read this manual in its entirety.**

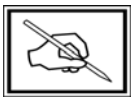
Symbols Key

SYMBOL	DEFINITION
	Potentially biohazardous material
	Keep dry
	Manufacturer
	Date of manufacture
	Serial number
	Part number

Regulatory Agency Symbols

SYMBOL	DEFINITION
	Indicates CryoSeal FS System is cleared for sale in countries belonging to the European Union
	Indicates Authorized Representative for the CryoSeal FS System in the European Union
	Indicates WEEE directive 2002/96/EC for handling and disposal of electrical components in the European Union. Electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately.

Manual Text Conventions

SYMBOL	DEFINITION
	Pay close attention to indicated text
	Caution messages alert user to proper operation and use of the CryoSeal FS System
	Indicates warning of potential harm to user or damage to the CryoSeal FS System
	Indicates potential electrical hazard

Text Conventions

To convey information readily and consistently, certain text conventions are used throughout this manual. These conventions are as follows:

TEXT CONVENTION	USED FOR
Numbered Lists	Numbered lists should be carried out in the order listed. For example: 1. Remove the screws from the rear of the motor box. 2. Remove the screws from the control panel.
Bulleted Lists	Bulleted Lists indicate items to be carried out, but not necessarily in sequence (for example): • Check the fuses. • Make sure all snap connectors are tight.
Bold Typeface, Uppercase	Calls attention to a **CAUTION, WARNING,** or **DANGER**.
Bold typeface, lowercase	Emphasizes any **term** or **component** that is being described or referred to.

TEXT CONVENTION	USED FOR
Italics	Designates another section in this manual that should be consulted. For example: See *Maintenance* – Chapter 5. Emphasizes information specific to a particular Thawer model. For example: (*MT202 ONLY*) Water level should be just above the two drilled holes above the screws in the middle of the rear section of the chamber.

Electrical Safety

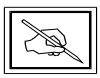
CAUTION: Contact Helmer Technical Service for assistance if you have any questions concerning the electrical connection for the Thawers. When servicing the Thawers, make sure the power switch is turned off and the unit is unplugged.

CAUTION: The Thawers are designed in accordance with Protection Class I (IEC). The chassis of the system is connected to ground by means of a cable, and surfaces on the system that the operator may come in contact with are connected to the chassis by means of screw connections. For protection against electrical hazards, the system must be directly connected to a properly grounded electrical source approved by a qualified electrician. Contact Helmer Technical Service for assistance for the Thawer.

NOTE: Electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately in the European Union. For disposal in other areas, follow local regulations for disposal of electrical and electronic components.

Cautions and Safety Instructions

Safety precautions that are necessary when operating, maintaining, and troubleshooting the Thawers are outlined below. It is important that these precautions be carefully read and understood. This information should also be made aware to new employees.



NOTE: Thoroughly read this manual.

CAUTION: Wear gloves and observe biohazardous precautions.

NOTE: Use the Thawers only for their intended purpose.

NOTE: Install the Thawers according to instructions.

CAUTION: Do not attempt to pick up the equipment when filled, which will result in damage to the bottom seal. The MT202 and MT204 may be moved by sliding them on the counter. The MT210 is mounted on wheels for easy mobility.

CAUTION: Do **NOT** place sharp or pointed objects into the pockets.

CAUTION: Never unplug Thawers by pulling on the cord. Grasp the plug firmly and pull straight out of the outlet.

CAUTION: Unplug Thawers before cleaning, repairing or replacing a fuse.

CAUTION: Never attempt to run the Thawers with the electrical covers off.

CAUTION: Do **NOT** overfill.

CAUTION: Add disinfectant liquid.

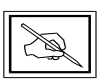
CAUTION: Do **NOT** attempt to operate Thawers if the circuit breaker trips repeatedly.

CAUTION: If the water bath temperature exceeds the max set point (37.1°C), the Thawers will not operate. The control panel will not respond. Contact Helmer Technical Service as soon as possible.

CAUTION: For greatest assurance of proper and safe operation, keep this manual in a place where it is readily accessible for reference.

NOTE: During disassembly, keep parts in order to facilitate re-assembly.

CAUTION: Prior to starting any electrical work, disconnect all power to the Thawers.



NOTE: Check all hose and wiring connectors to make sure they are secure and correct.

NOTE: When replacing fuses, be sure the new fuse has the correct amperage rating.

CAUTION: The user shall be made aware that, if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Copyright Notice

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Disclaimer

THERMOGENESIS CORP. has thoroughly reviewed the contents of this manual to make it an informative and easy-to-use guide for the operation of the equipment and devices described herein. All statements, technical information and recommendations contained in this manual or related documentation are current and believed to be reliable. For this reason, the contents of this manual are not intended to be and should not be understood as representations or warranties concerning the equipment and devices described herein.

All THERMOGENESIS CORP. products, including the products described in this manual, are covered by specific and limited warranties as described below.

Help Line

If there are questions about equipment, service or device warranties, call Helmer Technical Service weekdays (except U.S. holidays) from 8:00 a.m. to 5:00 p.m. Eastern Standard Time. The fax line and website are accessible 24 hours a day.

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European Union Authorized Representative

Medical Device Safety Service (MDSS) GmbH
Schiffgraben 41
D-30175 Hannover
Germany
www.mdss.com

Limited Warranty

THERMOGENESIS CORP. ("THERMO") products are designed and manufactured to provide reliable, trouble free performance when properly maintained and used in accordance with the operating instructions provided with each unit. Each unit is carefully inspected, tested and found to be in good working order prior to shipping.

Warranty

THERMO warrants to the original purchaser that the unit will be free from defects in materials or workmanship for one year from the date of shipment. THERMO also warrants that spare parts will be free from defects in material workmanship for a period of ninety (90) days, or the maximum time required by applicable local law, from the date of shipment of the spare part. Equipment failure due to reasons other than manufacturing defects such as accident, misuse or failure to timely perform scheduled maintenance in accordance with the maintenance schedule included with the operating instructions for the unit is excluded from Warranty coverage. This Warranty covers only the cost of parts needed to make Warranty repairs. Labor charges and shipping charges for replacement parts will be billed to the

purchaser. THERMO reserves the right to replace any malfunctioning unit or part with a new or refurbished unit in lieu of repairing such unit.

This warranty and THERMO's obligation to repair or replace defective parts is the sole and exclusive remedy of purchaser. Under no circumstances shall THERMO be liable for consequential or economic damages that might arise from a defective part.

THERMO WARRANTIES, AS SET FORTH HEREIN, ARE EXCLUSIVE AND ARE IN LIEU OF, AND PURCHASER HEREBY WAIVES, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR WARRANTY OF NON-INFRINGEMENT.

Procedure

If Warranty repairs are needed, contact Helmer Technical Service. For emergency repairs at night or on weekends or holidays, contact your Helmer Authorized Service Provider ("Service Provider") directly and notify Helmer Technical Service on the next business day. Failure to notify Helmer Technical Service on the next business day after a request for emergency repairs may result in denial of coverage for that service call.

When calling for service have available: (1) detailed information about the problem; (2) the serial number of the unit; (3) the service record for the unit; (4) the date and place of purchase of the unit.

Limitations

EQUIPMENT OR SPARE PART MALFUNCTIONS OTHER THAN THOSE CAUSED BY DEFECTS IN MATERIALS OR WORKMANSHIP, INCLUDING MALFUNCTIONS CAUSED BY MISUSE, ACCIDENT OR FAILURE TO PERFORM SCHEDULED MAINTENANCE, ARE EXCLUDED FROM COVERAGE. ANY ALTERATIONS OR MODIFICATIONS MADE TO THE UNIT (OTHER THAN MODIFICATIONS OR ALTERNATIONS MADE BY THERMO) RENDER THE WARRANTY NULL AND VOID. THERMO WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM EQUIPMENT MALFUNCTION OR LOSS OF USE OF THE EQUIPMENT. THERMO MAY AUTHORIZE INDEPENDENT CONTRACTORS TO PERFORM SERVICE. SERVICE PROVIDERS ARE INDEPENDENT CONTRACTORS, NOT THERMO EMPLOYEES. CONSEQUENTLY, THERMO IS NOT RESPONSIBLE FOR THE ACTS OR OMISSIONS OF THE SERVICE PROVIDERS, INCLUDING WITHOUT LIMITATION, FAILURE BY A SERVICE PROVIDER TO RESPOND TO CALLS FOR EMERGENCY SERVICE IN A TIMELY FASHION.

Chapter 2
Overview

TABLE OF CONTENTS

System Summary 2-1

Specifications 2-1

Component Layout 2-2

Component Functions 2-2

System Summary

THERMOGENESIS CORP. Thawers quickly and efficiently thaw blood and blood components. Blood product bags can be placed directly into the pockets. Since the pockets protect the blood bags, overwraps are not required and may increase thaw time.

Thawers are ready at the push of a button, easy to use and easy to maintain. The Thawers are equipped with state-of-the-art digital electronic controls and processors engineered for reliability.

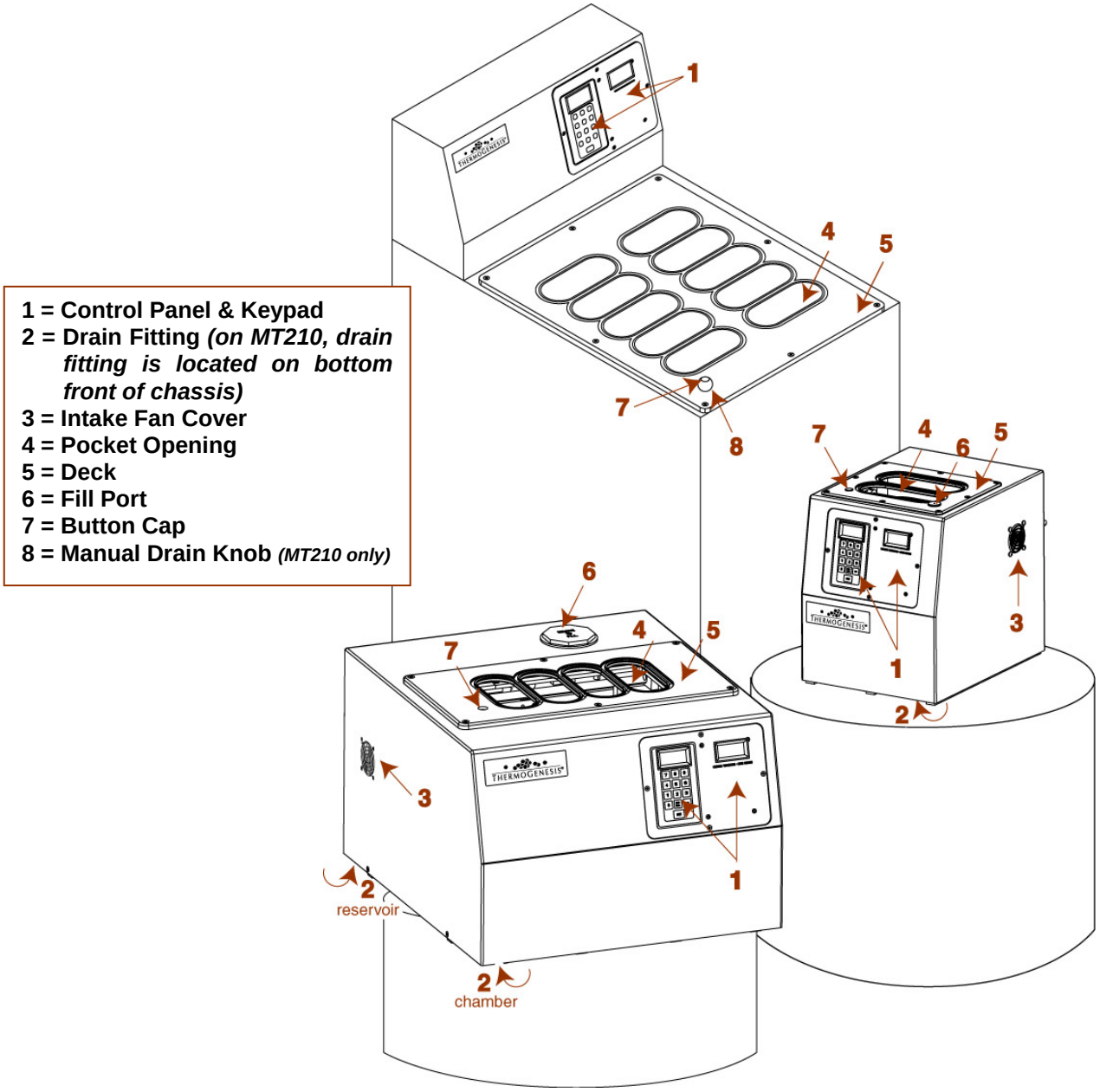
Specifications

Three Thawer models are available for thawing blood and blood components. Thawing capacity for each model is listed below.

	SPECIFICATION				
FEATURE	**MT202**		**MT204**		**MT210**
External dimensions	Width 12” (31 cm) Depth 16” (41 cm) Height 15” (38 cm)		Width 21” (53 cm) Depth 23” (58 cm) Height 15” (38 cm)		Width 19” (48 cm) Depth 29” (74 cm) Height 45” (114 cm)
Weight	30 lbs (14 kg)		75 lbs (34 kg)		150 lbs (68 kg)
Thawing capacity	2 Bags		4 Bags		10 Bags
Bath volume	3 gallons (11 liters)		9 gallons (34 liters)		28 gallons (105 liters)
Programmable temp range	Programmable, 30°C to 35°C		Programmable, 30°C to 35°C		Programmable, 30°C to 35°C
Temperature calibration accuracy	± 0.1°C		± 0.1°C		± 0.1°C
Heating power	400 W		1100 W		2700 W
Voltage	100-120	200-240	100-120	200-240	200-240
Current (Max)	8 A	6A	12A	6A	16A
Frequency	50/60 Hz				
Environmental	Temperature 15°C to 30 °C; 40 to 80 % RH (Indoor use only) IP 40; Pollution Degree 2				
Altitude	<2000m				
Circuit breaker required	10 Amps		15 Amps		20 Amps

Component Layout

Figure 2-1: *Component Layout*


1 = Control Panel & Keypad
2 = Drain Fitting (on MT210, drain fitting is located on bottom front of chassis)
3 = Intake Fan Cover
4 = Pocket Opening
5 = Deck
6 = Fill Port
7 = Button Cap
8 = Manual Drain Knob (MT210 only)
reservoir
chamber

Component Functions

Heating Element
Used to maintain the water reservoir at normal thawing temperature of 30°C to 35°C. The heating element is rated 400W for the MT202, 1100W for the MT204 and 2700W for the MT210.

Thermal Fuse
A second high-temperature safety device. If this device opens, it must be replaced. The thermal fuse functions as a regular fuse except that the thermal fuse "opens" because of temperature instead of electrical current. The thermal fuse is rated at 77°C.

Level Probe / Level Sensor Screw
Shuts off power to the pumps if the water in the reservoir drops to an unacceptable level. The level probe/level sensor screw is an electronic sensor, which monitors a small electrical current leaked to the reservoir. If the water level is low, the level probe no longer detects the current that activates the low-level electronics.

Manual Drain (*MT210 only*)
The manual drain is located at the front left side of the deck and allows fast draining of water from the chamber when pulled up.

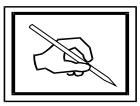
Gear Motor
A drive motor for the agitator bar to consistently tap the product being thawed, after a five-minute delay.

Fill Pump
A submersible pump used to transfer water into the chamber during a thaw cycle.

Drain Pump (*MT204 only*)
A submersible pump used to pump water out of the chamber at the end of a thaw cycle.

Circulation Pump (*MT210 only*)
A submersible pump used to circulate the water in the reservoir during rest to maintain a constant temperature.

Control Panel
The controls and display functions are located on the front control panel (Figure 2-2). The keypad on the control panel allows the user to control the operation and functions of the unit.



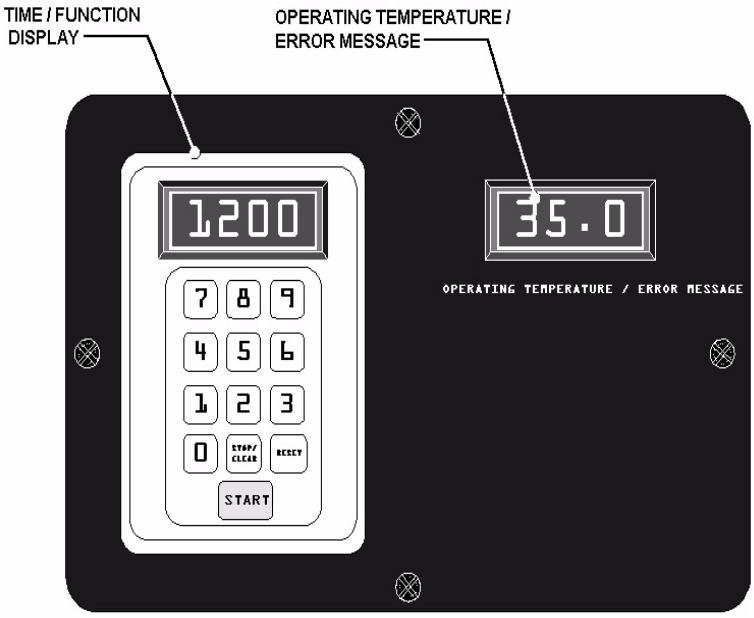
NOTE: Press the keypad buttons firmly and slowly to provide accurate input.

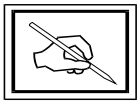
The time/function display, located directly above the keypad, displays the function status and the time remaining on the thaw cycle.

The operating temperature/error message display, located on the right of the keypad, displays the water temperature and any error messages that might occur. Error messages include "OVER TEMP" and "LOW FLD" (see

Section *Error Messages* – Chapter 4 and Section *Unit Overheating (Overtemp)* – Chapter 6 and Section *Low Fluid Warning* – Chapter 6).

Figure 2-2: *Control Panel*





NOTE: If the displays are not lit while the Thawer is still plugged into the power outlet and the power switch is switched to ON, disconnect the equipment from the wall plug and contact maintenance or Helmer Technical Service customer service.

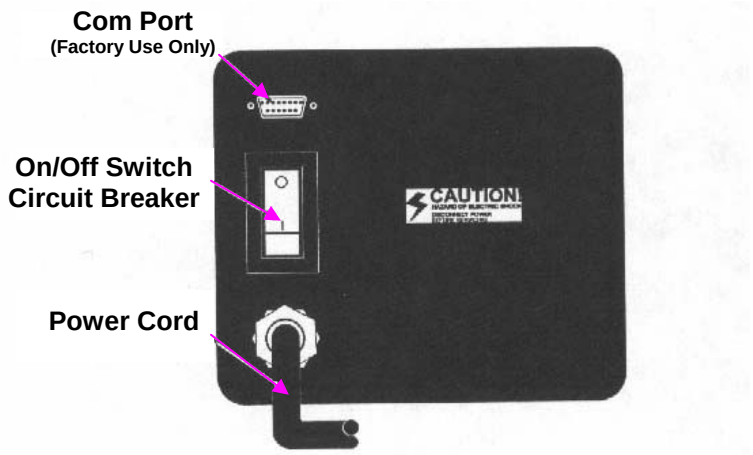
Alarm Signal

At the end of the thaw cycle, an audible five-second alarm indicates the completion of the thaw cycle. The alarm also sounds when an error message has occurred.

Back Power Panel

The back power panel is located on the back of the Thawers and contains the ON/OFF switch, which is also the circuit breaker (Figure 2-3).

Figure 2-3: *Back Power Panel*



CAUTION: The back power panel is a high voltage panel. Use safety precautions when working on the back power panel.

ON/OFF Switch/Circuit Breaker

The ON/OFF switch is located at the rear of the Thawers, near the top (Figure 2-3*)*. This switch also functions as the circuit breaker. If this circuit breaker trips it will shut off the power to the Thawers. To reset this circuit breaker simply turn it back ON. If the circuit breaker trips again, contact your service technician or Helmer Technical Service.

NOTE: The ON/OFF switch must be left ON so that the Thawers will be ready to use at any time.

WARNING: If the circuit breaker trips immediately when a Thawer is turned on, or if the breaker trips repeatedly, **DO NOT** operate the equipment. Contact your service technician or Helmer Technical Service.

Power Cord — MT202 and MT204

The power cord uses a 15A, hospital grade plug. This plug requires a 110VAC, 20A socket (International requires 220VAC, 15A socket).

Power Cord — MT210

The MT210 is equipped with a 6’ power cord without a plug. The power cord requires a 220VAC, 20A, hospital grade plug.

CAUTION: The power cord must be unplugged from the wall socket before opening any access to the Thawers. As a safety precaution, never run the Thawers with the cover removed.

Chapter 3
Installation

TABLE OF CONTENTS

Unpacking and Inspection 3-1

Installation 3-2

Filling The Reservoir – MT202 and MT204 3-3

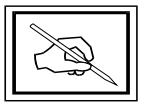
Filling The Reservoir – MT210 3-4

Overfilling 3-5

Overfilling – MT202 & MT204 3-5

Overfilling – MT210 3-6

Completing The Installation 3-7



NOTE: BEFORE STARTING, READ THIS MANUAL CAREFULLY!

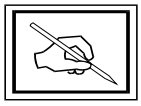
Write down the serial number and date of purchase. The serial number is located on the back of the unit. Use these numbers for any correspondence. Please take time to write these numbers here:

Model Number: _____

Serial Number: _____

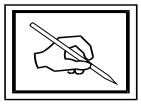
Date of Purchase: _____

Unpacking and Inspection



NOTE: THERMOGENESIS CORP. uses "tip and tell" and/or "shock watch" devices to indicate whether the shipment has been subjected to rough treatment. These devices are placed externally on the packing case. If any change in the indicators is noticed, clearly note it on the delivery receipt.

Be sure to check for shipping damage when receiving the thawer. Inspect the container and equipment for any signs of damage. Immediately note any damage and report it to the shipping agent. Contact Helmer Technical Service if there are any problems.



NOTE: The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material if reshipment is necessary.

The following additional items are included in the packaging with the Thawers:

MT202	MT204	MT210
(1) Operator & Service Manual	(1) Operator & Service Manual	(1) Operator & Service Manual
(2) Pocket Weights and Pockets	(4) Pocket Weights and Pockets	(10) Pocket Weights and Pockets
(1) Drain Hose	(1) Drain Hose	(1) Drain Hose
(2) Spare Pockets	(2) Spare Pockets	(1) Drain Adapter
(1) Four-ounce Bottle Water Conditioning Liquid	(1) Four-ounce Bottle Water Conditioning Liquid	(4) Spare Pockets
(1) Spare Thermotube Boot	(1) Spare Thermotube Boot	(1) Four-ounce Bottle Water Conditioning Liquid
(1) Fuse Kit	(1) Fuse Kit	(1) Spare Thermotube Boot
(1) Pocket Repair Kit	(1) Pocket Repair Kit	(1) Fuse Kit
		(1) Pocket Repair Kit

A Material Safety Data Sheet (MSDS) for the Water Conditioning liquid is included with the unit. If there are any other questions, contact Helmer Technical Service.

Installation

1. Place the Thawer in the location where it will be used.
2. (*MT210 ONLY*) Attach an appropriate plug to the power cord that matches your existing electrical wall socket (see Section *Specifications* – Chapter 2 for appropriate plug configuration).

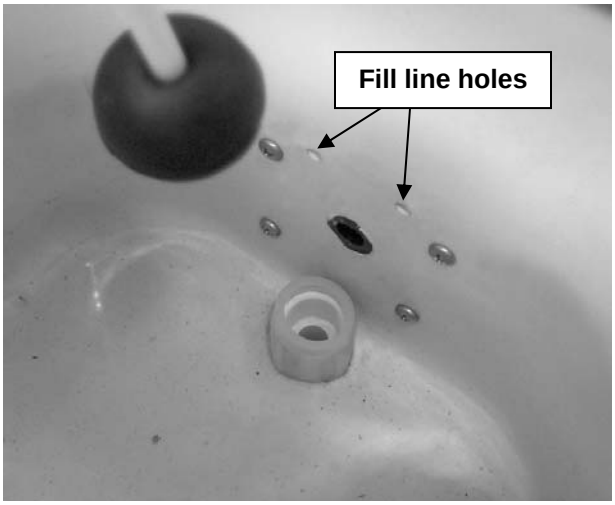
CAUTION: Do not plug in the Thawer at this time.

CAUTION: (*MT202 and MT204 only*) Make sure there is adequate space around the thawer to ensure adequate ventilation. Make sure that there is at least 1” of space between the wall and the silver intake fan cover on the right side of the Thawer. (*All Thawers*) Make sure there is also 1” of space between the wall and the black fan filter on the rear of the Thawer.

Filling the Reservoir — MT202 and MT204

1. Place one pocket weight into the bottom of each pocket.
2. The pockets must hang straight into each opening directly between two of the rocker arms. The pockets must not be draped over a rocker arm.
3. Remove the round cover from the fill port on the top (see item 6 in Figure 2-1, *Component Layout* – Chapter 2). The cover is a press fit and pulls straight up.
4. (*MT202*) Water level should be just above the two drilled holes above the screws in the middle of the rear section of the chamber (Figure 3-1).

Figure 3-1: *MT202 water fill line holes*



5. (*MT204*) Inside the fill port is the fluid level indicator, a clear rod attached to the bottom of the fill sleeve. This rod indicates the reservoir is full. Pour water into the reservoir through the fill port until the water level reaches the bottom of the rod. Be careful not to overfill. If you overfill the Thawer, follow the drain procedure in Section *Overfilling* – Chapter 3.

WARNING: It is recommended to use distilled or regular low-mineral tap water in the Thawers. Low-mineral tap water must not be used when the level of “metallic” and/or “corrosive” types of mineral contents are high. In such cases, use only distilled water. **DO NOT** use de-ionized water in the Thawers.

6. Final bath volume should be approximately 3 gallons for the MT202 and 9 gallons for the MT204.
7. *When the reservoir is full on the MT202*, lift an edge of a pocket and pour 2 ml THERMOGENESIS CORP. Water Conditioner Liquid (disinfectant) in the chamber. Re-install the pocket (see Section *Removing and*

Replacing a Pocket – Chapter 5). Replace the round cover from the fill port.

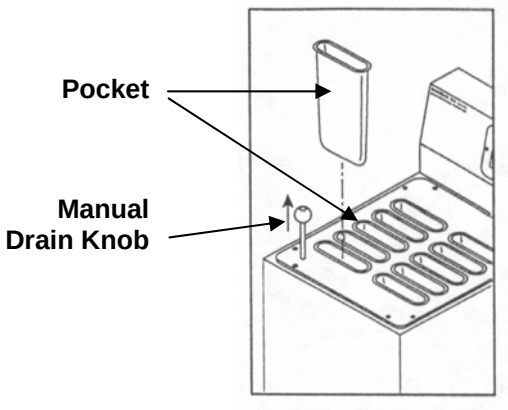
8. *When the reservoir is full on the MT204*, pour 5 ml THERMOGENESIS CORP. Water Conditioner Liquid (disinfectant) in the reservoir through the fill port. Replace the round cover from the fill port.
9. Proceed to Section *Completing the Installation*.

WARNING: To avoid damage to the heater element, do not use chlorine or other oxidizers as a disinfectant in the thawers.

Filling The Reservoir – MT210

1. Remove the pocket located on the front left corner of the Thawer (see Section *Removing and Replacing a Pocket* – Chapter 5) (Figure 3-2). This pocket is located next to the large white manual drain knob.

Figure 3-2: *Removing the pocket*

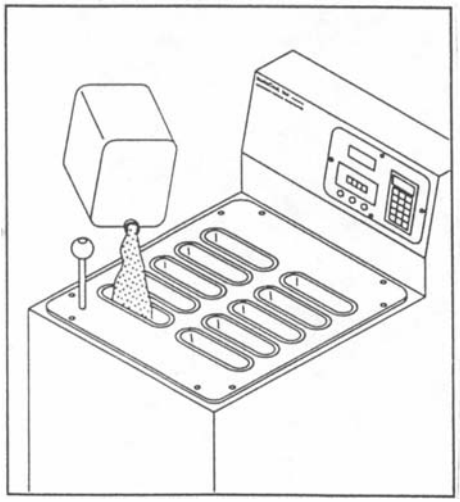


2. Pull the manual drain knob (Figure 3-2).

WARNING: It is recommended to use distilled or regular low-mineral tap water in the MT210 Thawer. Low-mineral tap water must not be used when the level of “metallic” and/or “corrosive” types of mineral contents are high. In such cases, use only distilled water. **DO NOT** use de-ionized water in the Thawers.

3. Pour water, through the pocket opening, into the chamber (Figure 3-3). The water will drain through the open manual drain valve into the reservoir of the thawer. Water may be observed in the reservoir through the manual drain opening. The reservoir is full when the water reaches the bottom of the chamber (approximately 28 gallons) or the water level has reached the manual drain opening.

Figure 3-3: *Filling the Thawer*



4. Add 20 ml of THERMOGENESIS CORP. Water Conditioning Liquid (disinfectant) to the chamber.

WARNING: To avoid damage to the heater element, do not use chlorine or other oxidizers as disinfectant in the Thawers.

5. Re-install the pocket (see *Removing and Replacing a Pocket* – Chapter 5).
6. Proceed to Section *Completing the Installation*.

Overfilling

These procedures can be used to drain a small amount of excess water from the Thawers. To completely drain the Thawers, see Section *Draining the Thawer* – Chapter 5. If the Thawers are overfilled with water, proceed with the following steps:

Overfilling — MT202 & MT204

CAUTION: Do not attempt to lift or carry the Thawer while it is full of water. Carefully slide the Thawer to a position near a sink or to the edge of the counter. Place the drain hose in the sink or container on the floor below the Thawer.

1. No cycles can be running and the unit must be at rest. Turn OFF the unit.
2. *On the MT202*, there is one drain fitting located underneath the right side of the unit. *On the MT204*, there are two drain fittings: one to drain the reservoir and one to drain the chamber (see item 2 in Figure 2-1,

Component Layout – Chapter 2). Both drain fittings are located underneath the left side of the unit. Slide the Thawer (do not pick it up) so the drain fittings are positioned over the edge of a sink or over the front edge of the counter or sink.

NOTE: On the MT204, for draining a small amount of water to correct overfilling, utilize the reservoir drain fitting (see item 2 in Figure 2-1, *Component Layout* – Chapter 2).

3. Place the discharge end of the drain hose into the sink or suitable container. Push in the metal tab of the drain fitting and attach the drain hose onto the drain fitting.
4. Drain a small amount of water from the reservoir into the sink or suitable container.

CAUTION: If draining water contaminated with algae, bacteria, or blood product, wear gloves and observe biohazardous precautions (see Section *Decontamination* – Chapter 5).

5. Verify water level is correct.
6. When finished, remove the drain hose by pressing in on the metal tab of the drain fitting and pull the drain hose from the fitting.

CAUTION: Water may leak out of the drain hose and drain fitting when the drain hose is removed.

Overfilling — MT210

1. Remove the cap from the drain fitting located at the bottom front of the thawer (Figure 3-4).
2. Insert the drain hose onto the drain fitting, by pressing the drain hose over the drain fitting. Snap the two metal latches back past the side of the drain hose (Figure 3-5).

Figure 3-4: *Drain Fitting Location*

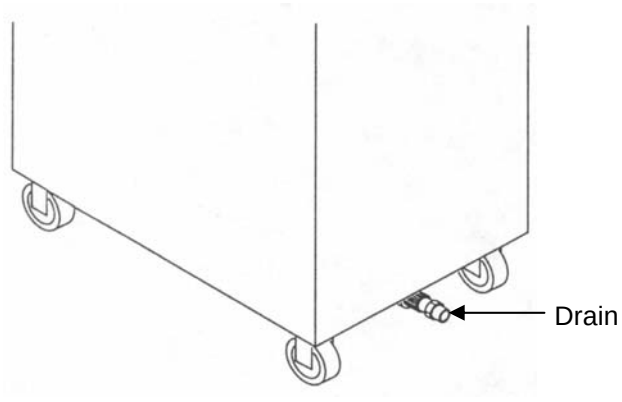
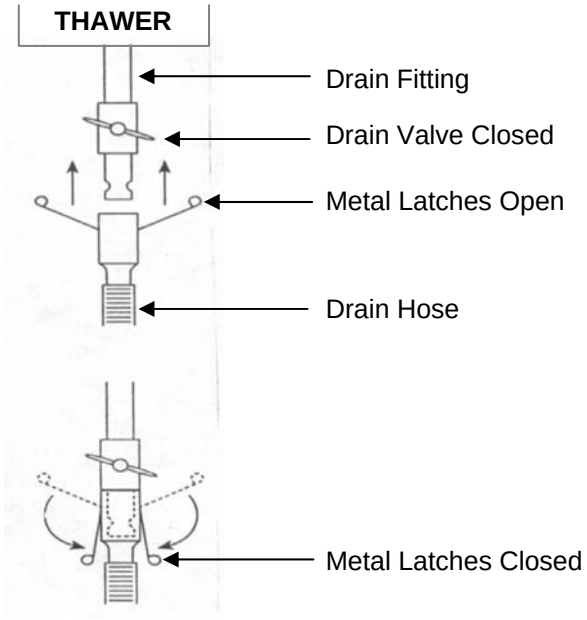


Figure 3-5: *Metal Latches*



3. Open the drain valve and allow the excess water to drain into a suitable container.
4. To stop the drain process, close the drain valve and drain the excess water out of the drain hose.
5. Release the metal latches and then remove the drain hose from the drain fitting.
6. Replace the cap on the drain fitting.

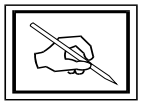
CAUTION: Water may leak out of the drain hose and drain fitting when the drain hose is removed.

Completing the Installation

1. Plug in the Thawer (see Section *Specifications* – Chapter 2 for appropriate electrical requirements).
2. Turn the Thawer ON using the power switch located on the rear power panel.

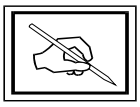
   When the Thawer is first switched ON, the control panel will display the model number, then the current software version. After few seconds, the time/function displays 12:00 minutes on the left, and the operating temperature/error message displays the current bath temperature on the right.

3. Press the START button on the display panel. The thawer will cycle for 12 minutes. This will mix the disinfectant and will fill the hoses and pumps with water.



NOTE: Thawer time and temperature settings have been programmed at the factory. Operating temperature is between 30°C and 35°C with an "overtemp" alarm at 37.1°C. If you want to select a bath temperature other than 35°C within the above range, see Section *Calibration of Operating Temperature* – Chapter 5. The Thawer is shipped with a default thaw cycle time of 12 minutes and operating temperature setting of 35°C.

4. The installation of the Thawer is complete.
5. After the completion of the initial cycle, verify the water level immediately after the drain cycle and add additional water if needed.



NOTE: When a thaw cycle is started, there is no initial movement of the agitator bar. Agitation begins approximately five (5) minutes after the beginning of the thaw cycle. This does not effect the thaw time and extends the life of the pockets.

Chapter 4
Operation

TABLE OF CONTENTS

Introduction 4-1

Operational Input Codes 4-1

Thawing Blood Components 4-2

Operating a Thaw Cycle 4-3

Interrupting a Thaw Cycle 4-3

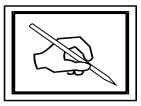
Resetting the Thaw Cycle Time 4-3

Operating Temperature/Error Message Display 4-4

Error Messages 4-4

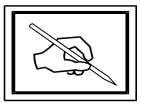
Resetting the Operating Temperature 4-5

Introduction



NOTE: For caution and safety instructions, see Section *Cautions and Safety Instructions* – Chapter 1.

The THERMOGENESIS CORP. Thawers quickly and safely thaw blood and blood components. When the thawing cycle is started, warm water enters the thawing chamber and molds the pocket around the blood product bag. After a five-minute delay, an agitator bar gently taps the bag causing a rippling motion within the fast-melting blood product.



NOTE: A 250 ml unit of frozen plasma thaws in about 12 minutes. A 450 ml unit of glycerolized red blood cells thaws in about 35 minutes.

It is **not** necessary and **not** desirable to use an overwrap when thawing blood products in the Thawers, as it may increase thaw times. If a blood product bag breaks or the pocket leaks, decontamination is simple, fast and safe.

Before beginning to use the Thawers, take a few minutes to become familiar with the use of the controls and the meanings of the indicators.

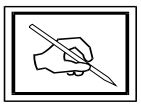
Operational Input Codes

The following codes are programmed to perform various functions with the Thawers. Enter the codes using the keypad on the control panel. Codes are universal among thawer models and are entered using the following sequence:

[CODE] → RESET → [DESIRED FUNCTION] → START

For example, to set the operating temperature to 33°C, the operator would enter “100”, press RESET, enter “330” (for 33.0°C) and press START to save the instructions.

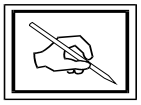
For example, to set the thaw cycle time, press RESET. The time/function display will flash the current thaw cycle time (i.e. – “1200” for 12 minutes, 00 seconds and “3500” for 35 minutes, 00 seconds). Enter the desired thaw cycle time and press START to save the new thaw cycle.



NOTE: Press START within 10 seconds to save instructions; otherwise, the Thawer will default to the previous setting.

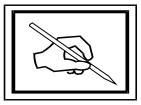
CODE	FUNCTION
100	Set operating temperature
200	Set calibrated operating temperature
RESET	Set or reset thaw cycle time
START	Begins thaw cycle and/or loads commands to memory
STOP/CLEAR	Interrupts or cancels a thaw cycle
42	Changes the display language (*1 = English, 2 = French, 3 = Swedish, 4 = German, 5 = Spanish*)

Thawing Blood Components



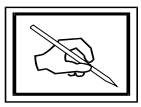
NOTE: If the pocket leaks, dry the blood product bag carefully, especially the access ports. Even though a bactericidal agent is used in the water in the thawer, it is necessary to dry the ports well to prevent contamination. Put the leaking pocket aside for later repair using the pocket repair kit included with the Thawer. Replace the pocket as described in Section *Removing and Replacing a Pocket* – Chapter 5.

1. Place one bag into each pocket.



NOTE: The Thawers have been factory-validated for thawing a 300 ml bag of plasma (250 ml fill) in 12 minutes and 35 minutes for a 600 ml bag (450 ml fill) of glycerolized red cells. Thaw cycle time for other volumes and bag sizes will need to be validated independently by each facility.

2. Set the timer for the proper thaw cycle time for the size of bag being thawed (see Section *Resetting the Thaw Cycle Time*). The thawing time varies with the size of the bag.
3. Press START. The automatic thawing cycle will be activated.
4. Remove blood product bag after the unit automatically drains. This is indicated by an alarm.



NOTE: *For the MT210,* pull up on the manual drain knob when the alarm sounds for a fast drain. If you do not pull up on the manual drain knob, the unit will drain using gravity (see Figure 3-2, Section *Filling the Reservoir – MT210* — Chapter 3).

5. If the blood product is not completely thawed, break up the remaining frozen product with your fingers, replace the bag in the pocket, and set the timer for a few more minutes.

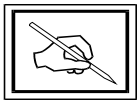
6. If the bag of blood product is wet, determine if the blood product bag broke, the pocket leaked or if the liquid is simply condensation (see Section *Decontamination* – Chapter 5).

WARNING: If the blood product bag is broken, discard bag and observe biohazardous precautions. Decontaminate Thawers by following the procedure in Section *Decontamination* – Chapter 5.

7. Do not dispose of the pocket if it is not damaged. The pocket may be repaired or decontaminated and re-used (see Section *Repairing a Pocket* or Section *Decontamination* – Chapter 5).

Operating a Thaw Cycle

Press START. The pump will start and the time/function display will read "FILL". When the fill cycle is complete, the time/function display will display the countdown time until it reaches zero. When the timer reaches zero, the time/function display will read "DRN↓" (Drain). When the Drain function has been completed, the time/function display will revert to show the total set time and sound a five-second alarm that the thaw cycle is complete.

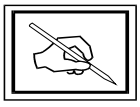


NOTE: *For the MT210,* pull up on the manual drain knob when the alarm sounds for a fast drain. If you do not pull up on the manual drain knob, the unit will drain using gravity (see Figure 3-2, Section *Filling the Reservoir – MT210* — Chapter 3).

Interrupting a Thaw Cycle

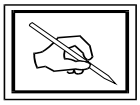
1. Press STOP/CLEAR. The time/function display will read "DRN↓" (Drain). *On the MT210*, manually drain the thaw chamber by pulling up on the manual drain knob on top of the deck. "INT" (Interrupt) will be displayed on the control panel.
2. To resume the thaw cycle, press START. The Time/Function Display will indicate a fill cycle and resume the remaining countdown before the thaw cycle was interrupted.
3. To cancel the interrupted thaw cycle, press STOP/CLEAR. The time/function display will reset to the preset thaw cycle time.

Resetting the Thaw Cycle Time



NOTE: This can only be done when the equipment is at rest.

1. Press RESET. The time/function will display the current thaw cycle time flashing (i.e., "1200" for 12 minutes, 00 seconds).
2. Enter the desired thaw cycle time using the keypad (i.e. – "1200" for 12 minutes for thawing a 250 ml unit of frozen plasma or "3500" for 35 minutes to thaw a unit of 450 ml glycerolized red blood cells). As the new thaw cycle is entered, it will be displayed on the time/function display.
3. Press START to save the new thaw cycle time. Once saved, this will be the preset thaw cycle time until a new thaw cycle time is entered and saved.



NOTE: If START is not pressed within 10 seconds of changing the thaw cycle time, the equipment will revert to the last saved thaw cycle time.

4. If you made an error in your input and want to start over, press STOP/CLEAR. (This function can only be used during the 10-second input period.)
5. Check that the correct thaw cycle time is indicated on the time/function display. If an incorrect time has been entered, reset the timer by pressing the RESET button and repeating the above steps.

Operating Temperature/Error Message Display

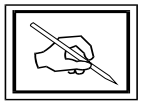
During normal operation, the operating temperature/error message display displays the current temperature of the water reservoir. During the bath temperature set operation, the current bath temperature setting will be displayed and error messages will be displayed as required.

The operating temperature is factory-set at the optimum operating temperature of 35°C with an overtemp alarm at 37.1°C. The thawer will maintain a uniform operating temperature at all times while the equipment is turned on. Therefore it is always ready to thaw blood products.

However, the user may select an operating temperature ("bath temperature") in a range of 30°C to 35°C. Once set, the thawer will operate in a ±1.0°C range of bath temperature. For example, if the bath temperature is set at 35°C; the thawer will operate in a range of 34°C to 36°C. The overtemp is factory-set at 37.1°C and is not adjustable.

Error Messages

Unit Overheating (Overtemp)



NOTE: The equipment will be disabled if an overtemp condition occurs.

There are three primary reasons the unit would enter into an overtemp condition:

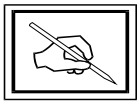
- Incorrectly calibrated operating temperature
- Control panel failure
- Heater failure

If an overtemp condition occurs, the operating temperature/error message display will flash "OVER TEMP". Troubleshoot an overtemp situation using Section *Unit Overheating (Overtemp)* – Chapter 6.

Low Fluid Warning

WARNING: Continued operation of the Thawer in a low-fluid condition will result in damage to the pumps and may cause the heating element to overheat and void the warranty. Discontinue use of the Thawer (see Section *Troubleshooting* – Chapter 6).

"LOW FLD" will be displayed on the operating temperature/error message display when the water is below the recommended operating level.



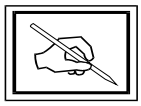
NOTE: This will not disable the equipment during a thaw cycle. However, at the end of a thaw cycle or if the equipment is at rest, the Thawer will be disabled until the equipment has been filled to a safe level and the RESET button has been pressed.

Three possibilities can cause a low fluid alarm:

- low fluid
- ground problem
- corroded level probe

Troubleshoot an overtemp situation using Section *Low Fluid Warning* – Chapter 6.

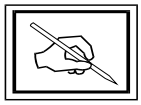
Resetting the Operating Temperature



NOTE: This can only be done when the equipment is at rest.

1. Enter "100" on the keypad then press RESET. The operating temperature/error message will display the current operating temperature setting.
2. Enter the new operating temperature (i.e. – 340 for 34.0°C). The new operating temperature will be displayed on the operating temperature/error message display. Only temperatures from 30°C to 35°C can be entered.

3. Press START to save the new operating temperature. This will be the preset operating temperature until a new operating temperature is entered and saved. Once the operating temperature is saved, the operating temperature/error message display will display the actual bath temperature. The equipment is now ready for operation.



NOTE: If START is not pressed within 10 seconds of changing the operating temperature, the equipment will revert to the last entered operating temperature.

4. If you have made an error in your input and want to start over, press STOP/CLEAR. (This function can only be used during the 10-second input period).
5. Check the operating temperature indicated on the operating temperature/error message display. If an incorrect operating temperature has been entered, reset the operating temperature by repeating the above steps.

Chapter 5
Maintenance

TABLE OF CONTENTS

Preventive Maintenance 5-1

Decontamination 5-1

Removing and Replacing a Pocket 5-3

Repairing a Pocket 5-4

Draining the Thawer — MT202 & MT204 5-5

Draining the Thawer — MT210 5-6

Verification of Operating Temperature 5-8

Calibration of Operating Temperature 5-9

Verification of Overtemp Error Code 5-10

Preventive Maintenance

SCHEDULE	MAINTENANCE DESCRIPTION
Monthly	• Check the power cord for any splits or frayed spots. Replace cord if necessary. • Check for level of disinfectant by observing for discoloration of waterbath or foul odor (see Section *Draining the Thawer – MT202 & MT204* or *Draining the Thawer – MT210*) if any signs of contamination are observed. • Check the water level.
Quarterly	• The temperature display should be checked for proper calibration (see Section *Verification of Operating Temperature*). • Change the water in the reservoir (see Section *Draining the Thawer – MT202 & MT204* or *Draining the Thawer – MT210*).
Six-month	• Verify the overtemp error code for proper operation.

Decontamination

Pocket Leaks

WARNING: Wear protective gloves and use biohazardous precautions.

If a blood product bag appears wet when it is removed from the pocket, place it in a plastic bag to determine if it is leaking. If the bag is intact, then the pocket may have a leak or ice may have condensed from the outside of the product.

Carefully dry the blood product bag, taking special care around the ports. Even though a bactericidal agent is used in the water in the thawer, dry the ports well to avoid contamination.

Pull the pocket loose from the thawer. Repair or replace with a new pocket (see Sections *Removing and Replacing a Pocket* and *Repairing a Pocket*).

Blood Product Bag Leaks

WARNING: Wear protective gloves and use biohazardous precautions.

If the blood product bag appears wet when it is removed from the pocket, place it in a plastic bag to determine if it is leaking. If it appears that the blood product bag is leaking, then the pocket must also be changed.

Pull the pocket loose from the thawer. Set the entire pocket assembly in a bag for later decontamination. Wipe up any blood product spills with a 10% bleach solution. Replace with a clean pocket (see Section *Removing and Replacing a Pocket*).

After the thawer is back in operation, the removed pocket can be decontaminated at your convenience. Wash and rinse the pocket to remove all visible signs of the blood product. Soak the pocket in a 10% bleach solution for a minimum of five minutes and no longer than 30 minutes. Make sure the entire (inside and outside) of the pocket is in contact with the bleach solution.

CAUTION: Rinse the pocket thoroughly after contact with bleach. Prolonged contact with bleach solution will weaken the pocket.

Pocket and Blood Product Bag Leak

WARNING: Wear protective gloves and use biohazardous precautions.

It is extremely unlikely that both the pocket and the blood product bag would leak at the same time. However, this would contaminate the water in the reservoir.

1. Carefully remove the broken blood product bag and put it into a bag for biohazardous waste disposal.
2. Remove pockets from the Thawer for decontamination (see Section *Removing and Replacing a Pocket*). Place pockets into a container for decontamination. Wipe up all drips and clean the deck and exterior of the Thawer with a 10% bleach solution.
3. Prepare a 10% bleach solution to run through the Thawer based on the table below. Follow the appropriate overfilling procedure in *Installation* – Chapter 3 to drain the amount of water according to the table below.

Model	Water to be Removed from Reservoir	Amount of Bleach to Add to Water
MT202	1.5 quarts	1.5 quarts
MT204	3 quarts	3 quarts
MT210	3 gallons	3 gallons

4. Push the START button and let the pumps run for approximately one minute to mix the bleach. Let the bleach solution stay in the thawer for **30 MINUTES** to decontaminate the water and unit.

CAUTION: Do not leave bleach in the Thawers longer than 30 minutes. Do not operate the Thawer routinely with bleach in it, as it may damage the Thawer.

5. After starting the 30-minute decontamination cycle on the Thawer, prepare a 10% bleach solution and pour it into the container with the contaminated pockets. Soak pockets in the solution for a minimum of five minutes and no longer than 30 minutes.

CAUTION: Make sure that the pockets are totally submerged in the bleach solution. Do not leave them in bleach solution for longer than 30 minutes. Prolonged exposure to bleach may weaken pockets.

6. After soaking the pockets for a minimum of five minutes and no longer than 30 minutes, drain the bleach solution and thoroughly rinse the pockets in clean water.
7. Dry the pockets. Test them individually to determine which pocket was leaking and whether the damaged pocket should be repaired or discarded (see Section *Repairing a Pocket*).
8. After the 30 minute decontamination cycle, drain the water into a sink or suitable container using the drain attachment and procedure as described in Section *Draining the Thawer – MT202 and MT204* or *Draining the Thawer – MT210*.
9. Refill the Thawer with water only as described in Section *Filling the Reservoir – MT202 and MT204* or *Filling the Reservoir – MT210* – Chapter 3.

WARNING: It is recommended to use distilled or low-mineral tap water in the Thawers. Tap water must not be used when the level of "metallic" and/or "corrosive" types of mineral contents are high. In such cases, use only distilled water. **DO NOT** use de-ionized water in the Thawers.

10. Enter "500" (five minutes) on the timer and push the START button to rinse the Thawer of any residual bleach.
11. Repeat steps 8 and 9.
12. Add the appropriate amount of disinfectant liquid (see Section *Filling the Reservoir – MT202 & MT204* or *Filling the Reservoir – MT210* — Chapter 3).
13. Re-install the pockets.
14. Run the thawer for five minutes to mix the disinfectant.
15. The thawer is now ready to return to normal operation.

Removing and Replacing a Pocket

Each pocket has one continuous seam. The top of the pocket has a snap seal which is used to attach it to the deck.

Removing a pocket:

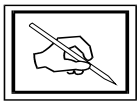
1. Reach into the pocket and remove the pocket weight.

2. Grab the inside front seam of the pocket approximately 1” below the snap seal.
3. Lift up to pop the snap seal loose from the deck lip.
4. Remove the pocket.

CAUTION: If pocket is being removed for decontamination, follow instructions in Section *Decontamination*.

Replacing a pocket:

1. Holding the top of the pocket, push the new pocket through the opening in the deck.
2. Seams of the pocket should always be aligned from the sides of the thawer.
3. Place the snap seal onto the deck lip.
4. Press the snap seal into place on the deck lip. Starting on one of the side seams, work around both sides of the snap seal, going toward the opposite side.
5. Replace the pocket weight.

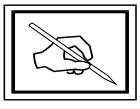


NOTE: As you reach the corner, the snap ring may appear to be a little too long because the snap ring stretches. In this case, press your fingers firmly against the snap ring and slide your fingers back toward the opposite corner already attached. This will slip the snap ring back and remove the “stretch”.

Repairing a Pocket

CAUTION: Wear protective gloves and use safety precautions. If repairing pocket during a decontamination procedure, follow biohazardous precautions.

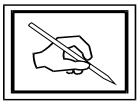
1. Use the pocket repair kit that comes with the Thawer (See Section *Unpacking and Inspection* – Chapter 3), a cotton swab and a disposable cup.
2. Remove the leaking pocket (see Section *Removing and Replacing a Pocket*).
3. Locate the hole visually or by filling the pocket with water and watching for leaks.



NOTE: The pocket repair kit is designed for repair of small holes, not for tears along the seam or around the snap seal ring.

4. Make sure the surface of the pocket to be patched is dry. Place a small amount of repair kit tape on the inside of the pocket covering the hole.
5. Clean 1 cm around the hole by applying a small amount of Cotol-240 with the cotton swab to the outside of the pocket.

6. In the disposable cup, mix equal amounts of Cotol-240 and Aquaseal using the wooden stir stick. The consistency should be like liquid glue.
7. Apply a coating of this mixture onto the hole overlapping 1 cm around the hole.
8. Let dry for a full 2 hours. Test the repaired pocket for leaks by following step 3. If there is no leak, then pocket is ready to use. If there is a leak, repeat the repair procedure (steps 4 through 8). Re-test for leaks before use.
9. A repaired pocket should be used as an interim solution. A repaired pocket should be replaced with a new pocket.



NOTE: Place the opened container of Aquaseal in the refrigerator for later pocket repairs. Once mixed, Cotol-240 and Aquaseal can be used until the glue becomes thick.

Draining the Thawer — MT202 and MT204

CAUTION: Do not attempt to lift or carry the thawer while it is full of water. Carefully slide the thawer to a position near a sink or to the edge of the counter. Place the drain hose in the sink or suitable container on the floor below the thawer.

1. No cycles can be running and the unit must be at rest. Turn off the unit.
2. *On the MT202*, there is one drain fitting located underneath the right side of the unit. *On the MT204*, there are two drain fittings: one to drain the reservoir and one to drain the chamber. Both drain fittings are located underneath the left side of the unit. Slide the Thawer (do not pick it up) so the drain fittings are positioned over the edge of a sink or over the front edge of the counter or sink.
3. Place the discharge end of the drain hose into the sink or suitable container. Press the metal tab of the drain fitting in and push the drain hose into the drain fitting.

CAUTION: If draining water contaminated with algae, bacteria, or blood product, wear gloves and observe biohazardous precautions (see Section *Decontamination*).

4. Drain the reservoir of the MT202. Drain both the chamber and reservoir of the MT204.
5. When finished, remove the drain hose by pressing in on the metal tab of the drain fitting and pull the drain hose from the fitting.

CAUTION: Water may leak out of the drain hose and drain fitting when the drain hose is removed.

6. Refill the Thawer with water only as described in Section *Filling the Reservoir – MT202 and MT204* — Chapter 3.

WARNING: It is recommended to use distilled or low-mineral tap water in the Thawers. Tap water must not be used when the level of "metallic" and/or "corrosive" types of mineral contents are high. In such cases, use only distilled water. **DO NOT** use de-ionized water in the Thawers.

Draining the Thawer — MT210

1. No cycles can be running and the unit must be at rest. Turn OFF the unit.
2. Move the thawer near a sink or suitable container so one operator can hold the drain hose and operate the timer.
3. Remove a pocket from the center of the deck.
4. Screw the drain adapter into the drain valve in the bottom center of the chamber.
5. Attach the drain hose to the drain adapter. Place the discharge end of the drain hose in a sink or suitable container.

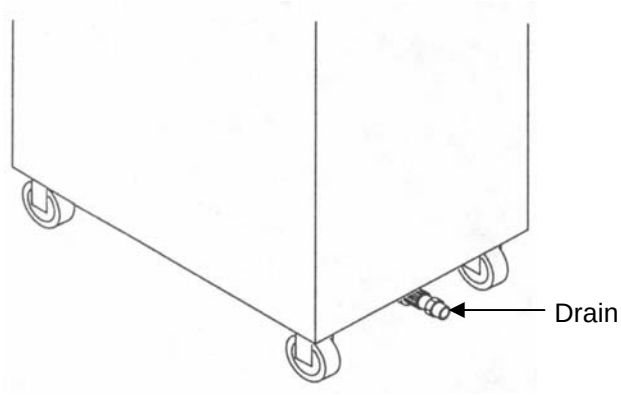
WARNING: DO NOT lay the drain hose in the sink or container. The water discharge has enough force to move the hose.

6. Turn the power ON.
7. Hold the drain hose. Set five minutes on the timer, then press START. When the reservoir is empty, immediately shut off the power.

CAUTION: A large volume of water will be pumped (approximately 28 gallons). This volume of water could be more than a sink drain will handle. Take care not to overfill the sink. If this occurs, turn OFF power to unit.

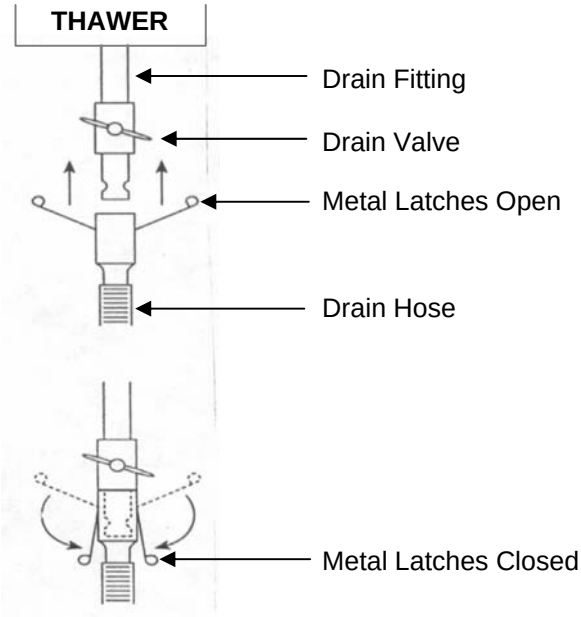
8. Disconnect the drain hose from the drain adapter.
9. Remove the cap from the drain fitting located at the bottom front of the thawer (Figure 5-1).

Figure 5-1: *Drain Fitting Location*



10. Attach the drain hose to the bottom drain fitting and snap the two metal latches back past the side of the drain hose (Figure 5-2).

Figure 5-2: *Metal Latches*



11. Open the drain valve and drain into a suitable container. When the reservoir has finished draining, close the drain valve and release the metal latches and then remove the drain hose.

CAUTION: Water may leak out of the drain hose and drain fitting when the drain hose is removed.

12. Replace the cap on the drain fitting.

13. Unscrew and remove the drain adapter from the drain valve in the center of the reservoir. Re-install the pocket.
14. Refill the Thawer with low mineral tap water or distilled water as described in Section *Filling the Reservoir – MT210* — Chapter 3.
15. Refill the Thawer with water only as described in Section *Filling the Reservoir – MT210* — Chapter 3.

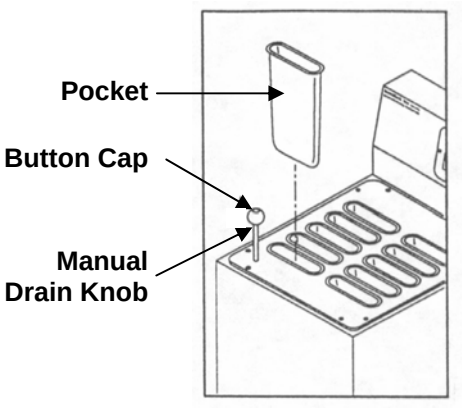
WARNING: It is recommended to use distilled or low-mineral tap water in the Thawers. Tap water must not be used when the level of "metallic" and/or "corrosive" types of mineral contents are high. In such cases, use only distilled water. **DO NOT** use de-ionized water in the Thawers.

Verification of Operating Temperature

NOTE: THERMOGENESIS CORP. recommends checking the temperature calibration and the operating temperature display for proper calibration on a quarterly basis or as required by the operator's internal procedures or local regulations. THERMOGENESIS CORP. also recommends verification of the overtemp error code every six months.

For the MT202 and MT204, on the front, left corner of the deck is a button cap (see Figure 2-1 Section *Component Layout* – Chapter 2) to check the calibration of the temperature indicator. *For the MT210*, on the front, left corner of the deck is the manual drain. Located on top of the manual drain knob is a 3/8" button cap (Figure 5-3).

Figure 5-3: *Button Cap/Manual Drain Knob (MT210)*



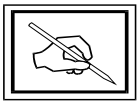
To check the calibration of the operating temperature/error message display:

1. Remove the button cap and carefully place a 12-inch thermometer, calibrated against a National Institute of Standards Technology (NIST) thermometer, into the tube.

CAUTION: Pay careful attention when placing the thermometer into the tube. The tube has a thermotube boot attached which will tear if the thermometer is forced into the tube.

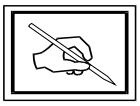
2. Run the thawer for a five-minute cycle. Read the thermometer when the pump stops and the water still surrounds the pocket. Note the difference between the operating temperature/error message display and the calibrated thermometer.
3. If the displayed temperature is the same as the calibrated thermometer, no further action is required.
4. If the display temperature is not the same as the calibrated thermometer, the bath temperature needs to be calibrated.

Calibration of Operating Temperature



NOTE: This can only be done when the equipment is at rest.

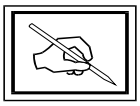
1. On the display panel, enter "200" then press RESET. The operating temperature/error message display will display the current bath temperature.
2. Enter the temperature from the calibrated thermometer using the keypad (e.g., 340 for 34.0°C). The calibrated bath temperature will be displayed on the operating temperature/error message display.
3. Press START to save the calibrated bath temperature. Once saved this will be the corrected bath temperature until a new bath temperature is entered and saved. Once the bath temperature is saved, the operating temperature/error message display will display the new bath temperature. The equipment is now ready for operation.



NOTE: If START is not pressed within 10 seconds of entering the calibrated bath temperature, the equipment will revert to the previously set bath temperature.

4. If you made an error and want to start over, press CLEAR. This function can only be used during the 10-second input period.
5. Check the bath temperature indicated on the operating temperature/error message display. If an incorrect bath temperature is displayed, reset the bath temperature by repeating the above instructions.

Verification of Overtemp Error Code



NOTE: This can only be done when the equipment is at rest.

1. Make sure the Thawer is at an operating temperature between 34.5 and 35.5°C.
2. On the display panel, enter "200", then press RESET. The operating temperature/error message display will show the current bath temperature.
3. Enter "372" for 37.2°C. The operating temperature/error message display will show "37.2".
4. Press START to save the temperature.
5. An "OVER TEMP" error will be displayed and an audible alarm will be emitted.
6. To reset to normal operating temperature, shut the power switch OFF for about 20 minutes.
7. See Section *Calibration of Operating Temperature* to reset Thawer to actual water bath temperature.

Chapter 6
Troubleshooting

TABLE OF CONTENTS

Introduction 6-1

Mechanical Problems 6-1

Unit not Heating 6-2

Power Surges 6-2

Radio Frequency Interference 6-2

Unit Overheating (Overtemp) 6-3

Unit not Filling 6-4

Unit not Draining — MT204 6-4

Unit not Circulating — MT210 6-4

Low Fluid Level 6-5

No Agitation 6-5

Introduction

CAUTION: This section and its contents are to be used by a qualified biomedical technician. Some of the test procedures in the following pages pose the danger of electrical shock.

Before troubleshooting the Thawers, make sure the Thawer is plugged into a power source and turned ON. Make sure the water level, the temperature settings, and the calibration are correct.

In the following test procedures, start with Step 1 and follow each step until you find the problem. If the problem has not been found after all the steps are completed, contact Helmer Technical Service. Explain the problem and what was found during the troubleshooting steps. Have the model number and serial number of the Thawer available.

Mechanical Problems

PROBLEM	PROBABLE CAUSE
Thawer completely inoperative	• Circuit breaker on wall is tripped. • Thawer is not plugged into wall outlet. • If equipped with a GFCI, GFCI is tripped. • Circuit breaker on back of Thawer is tripped (see Section *Component Function* – Chapter 2).
Pump is running, water not circulating.	• Defective plumbing • Defective pump *(*see Section *Unit not Filling)*
Product does not thaw in usual time.	• Volume of the product is larger than usual. • Pump #1 (fill pump) not working *(*see Section *Unit not Filling)* • Bath temperature not correct *(*see Section *Resetting the Operating Temperature* – Chapter 4) • Incorrect thaw cycle time *(*see Section *Resetting the Thaw Cycle Time* – Chapter 4) • Defective electronics • Low fluid *(*see Section *Low Fluid Level*)
Displays not lit	• No power to wall socket • Thawer not plugged in • Thawer not turned on • Defective electronics • Defective L.E.D.
Timer does not work.	• Defective keypad • Defective control panel

6. Troubleshooting

PROBLEM	PROBABLE CAUSE
Unit not heating	• Faulty fuse • Defective thermal fuse • No voltage at heater connector • Defective heater

Unit Not Heating

Perform the following steps to find the source:

1. Disconnect unit from power source.
2. Remove the screws on the rear of the back power panel. Pull the panel out and gently let it hang from the back of the Thawer. Do not unplug anything at this point.
3. Locate the fuse holder for the heater. Remove and check the fuse and replace if necessary. Check the fuse holder for possible damage.
4. Locate the thermal fuse plug on the rear of the back power panel. Remove the connector from the panel. Using a multimeter, check the continuity of the fuse at the connector. It should be closed. Replace the thermal fuse connector into the panel.
5. Remove the heater connector on the back power panel. Apply power to the machine. Check that the temperature reading on the front control panel is below 35^{o}C. With a voltmeter, check the voltage at the two outside pins of the heater connector on the back power panel (see Section *Specifications* – Chapter 2 for appropriate voltage requirements). If the voltage is present at this time, replace the heater.
6. If problem is not resolved, contact Helmer Technical Service.

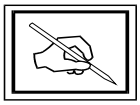
Power Surges

For power surges, a surge protector can be installed between the line voltage and the Thawer.

Radio Frequency Interference

To stop any Radio Frequency interference, we recommend that you keep any RF devices at least 8 to 10 feet away from the Thawer.

Unit Overheating (Overtemp)



NOTE: The equipment will be disabled if an overtemp condition occurs.

There are three primary reasons the unit would enter into an overtemp condition:

Incorrectly Calibrated Operating Temperature

1. Follow the steps in Section *Verification of Operating Temperature* – Chapter 5 to verify the current operating temperature.

Back Power Panel Failure

1. With the back power panel removed from the unit, but still plugged into all components of the Thawer, apply power to the unit.
2. Make sure the temperature is above 35.1°C on the front panel.
3. Remove the heater connector from the back power panel.
4. Check the voltage across the two outside terminals on the back power panel. There should not be operating voltage across these points. If there is, replace the back power panel.

Heater Failure

1. Disconnect the Thawer from the power source.
2. Lift the protective rubber boots from the top of the heater terminals. Using a multimeter, ohm the heater from terminal to terminal. Check from one side of the heater element to ground, the reading should be at least 2 megs to ground. If either fails, replace the heater. *See chart below for proper resistance.*

THAWER HEATER RESISTANCE

UNIT	SPECIFICATIONS (OHMS)
MT202/110V	28.74 – 33.28
MT202/220V	114.95 – 133.10
MT204/110V	10.45 – 12.10
MT204/220V	41.80 – 48.40
MT210/220V	17.03 – 19.72

6. Troubleshooting

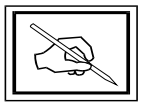
Unit not Filling

Disconnect unit from power source and remove the back power panel to check the appropriate fuse. Disconnect the power lead connector for the appropriate pump.

Fill Pump
Start a cycle and check the voltage at the two outside pins of the fill pump connector on the back power panel. If the voltage is correct at this point, replace the fill pump.

Unit not Draining — MT204

Drain Pump
1. With the back power panel removed from the unit, but still plugged into all components of the Thawer, unplug the drain pump.
2. Start a cycle and wait for the timer to start counting down. Hit the STOP button on the control panel to start the drain cycle.
3. At this point, measure the voltage across the two outside pins of the drain pump connector on the back power panel for voltage. If voltage is present, replace the drain pump.



NOTE: In the event a thawer does not seem to drain the chamber all the way, check to see if the thermotube boot is still attached. Excessive force inserting a thermometer to check temperature can cause the boot to become dislodged and ultimately sucked up into the drain pump. In this rare instance, look at the copper pickup tube in the product chamber to see if there is an obstruction there first. If the boot is not visible, you will need to remove the drain pump and copper tubing to find the obstruction.

Unit not Circulating — MT210

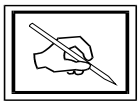
Circulation Pump
Check the voltage across the two outside pins of the circulation pump connector on the back power panel for voltage. If voltage is present, replace the circulation pump.

Low Fluid Level

Low Fluid Warning

WARNING: Continued operation of the Thawer in a low-fluid condition will result in damage to the pumps and may cause the heating element to overheat and void warranty. Discontinue use of the Thawer.

"LOW FLD" will be displayed on the operating temperature/error message display when the water is below the recommended operating level.



NOTE: This will not disable the equipment during a thaw cycle. However, at the end of a thaw cycle or if the equipment is at rest, the Thawer will be disabled until the RESET button is pressed.

Three possibilities can cause a low fluid alarm:

- low fluid
- ground problem
- corroded level probe or level sensor screw

Perform the following steps to find the problem:

1. Make sure the water level is correct.
2. Check the ground wire from the control panel to the back power panel. Check the ground from the level probe/level sensor screw harness on the control panel to the ground stud.
3. Check the level probe/level sensor screw for extensive calcium buildup or corrosion (see Section *Removing the Level Probe* or *Removing the Level Sensor Screw* – Chapter 7). In most cases, the level probe/level sensor screw can be cleaned using sandpaper or a file. If the probe or screw is beyond repair it needs to be replaced.

No Agitation

There is a problem with the gear motor, back power panel, or software.

Perform the following the steps to find the problem:

1. Turn the power OFF and disconnect unit from the power source.
2. Remove the back power panel and check the fuse for the gear motor.
3. With back power panel removed from the unit, but all cables still plugged in, except gear motor, reconnect the unit and turn the power ON.
4. On the control panel, press the START button.
5. After five minutes, check the voltage at the two outside terminals of the gear motor connector on the back power panel. The proper voltage should be displayed. If the voltage is correct, replace the gear motor. If the voltage is incorrect, contact Helmer Technical Service.

Chapter 7
Servicing the Thawers

TABLE OF CONTENTS

Verification After Servicing Thawers 7-1

Servicing the Thawers – MT202..... 7-1

Servicing the Thawers – MT204..... 7-4

Servicing the Thawers – MT210..... 7-7

CAUTION: This section and its contents are meant for use by a qualified biomedical technician and operator shall not attempt to service the Thawers. Some of the test procedures in the following pages pose the danger of electrical shock.

CAUTION: The power cord must be unplugged from the wall socket before opening any access to the Thawers. As a safety precaution, never run the Thawers with the cover removed.

Verification After Servicing Thawers

After servicing a Thawer, perform the following steps to ensure the Thawer is operating properly:

1. Fill Thawer with the proper amount of water.
2. Calibrate control panel to actual water temperature (see Section *Calibration of Operating Temperature* – Chapter 5).
3. Run six-minute thaw cycle to ensure fill pump is operating properly and gear motor turns on after five minutes.
4. *(MT204 only)* Check to make sure the water is pumped out of the chamber during the drain cycle.
5. Let the Thawer sit until proper operating temp is achieved (factory-set default is 35.0°C).

Servicing the Thawers — MT202

Removing the Cover

1. Disconnect the Thawer from the power source.
2. Remove the nine (9) screws holding the deck to the top of the Thawer. Remove deck.
3. Remove the four (4) screws holding the control panel in place and carefully tilt it out towards you. Take note of the wire connections and remove them. Set the control panel aside in an anti-static bag.
4. Remove the four (4) screws holding the back power panel in place at the rear of the Thawer. Gently pull the back power panel from the Thawer until the rear of the panel is visible. Take note of the wire connections and remove them. Set the back power panel aside.
5. Remove the four (4) screws holding the fan guard and the fan from the right side of the Thawer.
6. You should now be able to lift the cover off and set it aside.
7. Reverse the steps to replace the cover.

Removing the Top and Bottom Chassis

1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).

3. At the rear of the Thawer is a black compression fitting where the power cord from the pump to the back panel passes through. Cut the cable halfway between the connector and the compression fitting. (If you have an Amploc Brand pin removal tool, simply remove the connector from the end of the cable.) Push the cable down into the lower housing.
4. Remove the twenty-eight (28) screws from around the edge of the Thawer.
5. Gently lift the top housing from the bottom about 3 inches. You will then see a clear hose running from the back of the Thawer to a fitting that is attached to the temperature probe housing. Gently pull the hose from the fitting at that housing and remove the top chassis.

The Thawer is now at the point where you can make repairs as needed. Reverse the steps to replace the top and bottom chassis.

Removing the Heater

1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).
3. Split the top and bottom housing (see Section *Removing the Top and Bottom Chassis*).
4. Lift back the protective boots covering the top of the heater and remove the wires from the heater element.
5. Remove the large nuts from heater.
6. Remove ground connector from right side and set cable aside.
7. Note placement of metal and fibrous washers and remove. There is also a set of washers on the underside of the housing.
8. Remove heater.
9. Reverse the steps to replace the heater.

Removing the Temperature Probe

1. Remove the cover (see Section *Removing the Cover*).
2. Locate temperature probe at the front left side of the Thawer.
3. Unscrew brass compression nut and lift probe straight up and out of the brass fitting.
4. Reverse the steps to replace the temperature probe.

Removing the Control Panel

1. Turn Thawer off and disconnect from power source.
2. Remove the four (4) screws holding the control panel.
3. Tilt panel towards you and note cable connections. Remove them.
4. Place panel in an anti-static bag until ready to replace.
5. Reverse the steps to replace the control panel.

Removing the Back Power Panel

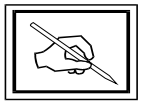
1. Turn Thawer off and disconnect from power source.
2. Remove the four (4) screws holding the back power panel.
3. Pull panel out from the Thawer. Note wire connections. Remove them.
4. Reverse the steps to replace the back power panel.

Removing the Thermal Fuse

1. Remove the back power panel by removing the four (4) screws from the back power panel and gently pulling it out and letting it hang from the Thawer.
2. Locate the white plastic compression fitting just behind the supply cord for the pump.
3. Follow the wires to the back power panel and disconnect the thermal fuse.
4. Loosen the compression nut on the fitting and lift the thermal fuse up and out of the Thawer.
5. Reverse the steps to replace the thermal fuse.

Removing the Fill Pump

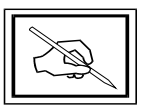
1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).
3. Split the top and bottom housing (see Section *Removing the Top and Bottom Chassis*).
4. Remove the two (2) rubber protectors from the hold down fittings inside the chamber. Remove the hold down fittings and remove the chamber.
5. Loosen the hose clamp from the top of the pump and remove the hose.
6. You can now remove the pump.
7. Reverse the steps to replace the fill pump.



NOTE: When replacing the pump, notice the position of the fittings and put them on the new pump using teflon tape on the threads.

Removing the Gear Motor

1. Disconnect the Thawer from the power source.
2. Remove the cover (see Section *Removing the Cover*).
3. Locate the pinion wheel on the gear motor shaft. Remove the retaining ring and washer from the pinion pin.
4. Slide the shaft linkage from the pinion pin. Note the washer left on the pin and remove it.
5. Remove the wire protective cage from the motor.
6. DO NOT remove the pinion wheel at this time.
7. Remove the two (2) locknuts holding the gear motor to the chamber. Take note of the placement of the orange rubber gasket and the plate on the inside of the chamber.
8. Remove the gear motor.
9. Reverse the steps to replace the gear motor.



NOTE: When replacing the gear motor, take special note of where the pinion wheel is located on the shaft before removing the old gear motor. Position of the pinion wheel is critical.

Servicing the Thawers — MT204

Removing the Cover

1. Disconnect the Thawer from the power source.
2. Remove the nine (9) screws holding the deck to the top of the Thawer. Remove deck.
3. Remove the four (4) screws holding the control panel in place and carefully tilt it out towards you. Take note of the wire connections and remove them. Set the control panel aside in an anti-static bag.
4. Remove the four (4) screws holding the back power panel in place at the rear of the Thawer. Gently pull the back power panel from the Thawer until the rear of the panel is visible. Take note of the wire connections and remove them. Set the back power panel aside.
5. Remove the four (4) screws (two on each side) at the base of the thawer.
6. Lift off the cover and set it aside.
7. Reverse the steps to replace the cover.

Removing the Temperature Probe

1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).
3. Cut the three (3) tie-wraps holding the temperature probe wire to the top of the chassis. Feed the sensor wire from the front of the Thawer through the slot on the side.
4. Remove the black rubber plug from around the sensor wire leading down into the reservoir.
5. Remove the fill indicator port from the top of the Thawer. The copper temperature rod is now visible against the wall of the chamber. With gentle but firm force, push the sensor up and out of the Thawer.
6. Reverse the steps to replace the temperature probe.

Removing the Top and Bottom Chassis

1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).
3. Refer to reference drawings in Chapter 9.
4. Remove the temperature probe (see Section *Removing the Temperature Probe*).
5. At the rear of the Thawer are two black compression fittings where the wires from the back panel to the pumps are located. Cut the wires halfway between the fitting and the connector. (If you have an Amploc Brand electrical contact pin removal tool, simply remove the connectors from the cables.) Mark one of the wires with tape and note which fitting it is in. Unscrew the compression fittings and push the wires down into the reservoir.

6. Remove the fill guide assembly from the top of the Thawer. Locate the white PVC drain pump tube. It is attached to the wall of the housing with a screw and plastic clamp. Remove the screw and clamp.
7. Gently turn the Thawer over on its top and remove the thirty-two (32) screws from the bottom of the Thawer.
8. With gentle but firm force, slowly lift the bottom assembly from the top and set it aside.
9. The Thawer is now at the point where you can make repairs as needed.
10. Reverse the steps to replace the top and bottom chassis.

Removing the Heater

1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).
3. Split the top and bottom housing (see Section *Removing the Top and Bottom Chassis*).
4. Refer to reference drawings in Chapter 9.
5. Lift back the protective boots covering the heater wiring and remove the wires from the top of the heater.
6. Remove the large nuts from heater.
7. Remove ground connector from right side and set cable aside.
8. Note placement of stainless and fibrous washers and remove. There is also a set of washers under the housing.
9. Slide the heater through the housing and pull up on the teflon standoff at the back of the Thawer to remove the heater from the chassis.
10. With firm force, unsnap the Teflon standoff from the heater and snap it on the one if replacing it.
11. Reverse the steps to replace the heater.

Removing the Level Probe *(for models produced before February 27, 2003)*

1. Turn the Thawer ON and start the cycle.
2. When the chamber is full, turn the Thawer OFF at the switch on the back power panel.
3. This will remove enough water from the reservoir to allow removal of the probe.
4. Unplug the Thawer from the power source.
5. Remove the four (4) screws from the back power panel and gently pull it out and let it hang from the Thawer.
6. Remove the nut and lock washer holding the wire to the top of the probe.
7. Remove the four (4) screws holding the probe to the chassis. Remove the level probe.
8. Reverse the steps to replace the level probe.

Removing the Level Sensor Screw *(for models produced after February 27, 2003)*

1. Turn the power OFF to the Thawer.

2. Drain 2” of water from the reservoir. To drain a small amount of water, see Section *Overfilling – MT202 and MT204* — Chapter 3.
3. Remove the control panel to gain access to the level sensor screw.
4. Remove the level sensor screw.
5. Reverse steps to replace the level sensor screw.
6. Refill water to the proper level (see Section *Filling the Reservoir – MT202 and MT204* — Chapter 3).

Removing the Thermal Fuse

1. Turn the Thawer ON and start the cycle.
2. When the chamber is full, turn the Thawer OFF at the switch on the back power panel.
3. This will remove enough water from the reservoir to allow removal of the probe.
4. Unplug the Thawer from the power source.
5. Remove the four (4) screws from the back power panel and gently pull it out and let it hang from the Thawer.
6. Locate the thermal fuse connector on the back power panel and unplug it.
7. Locate the white poly compression fitting that holds the thermal fuse and unscrew the compression nut. Lift the thermal fuse up and out.
8. Reverse the steps for replacing the thermal fuse.

Removing the Control Panel

1. Turn Thawer OFF and disconnect from power source.
2. Remove the four (4) screws holding the control panel.
3. Tilt panel towards you and note cable connections. Remove them.
4. Place panel in an anti-static bag until ready to replace.
5. Reverse the steps to replace the control panel.

Removing the Back Power Panel

1. Turn Thawer OFF and disconnect from power source.
2. Remove the four (4) screws holding the back power panel in place.
3. Pull the panel out from the Thawer. Note the wire connections. Remove them.
4. Reverse the steps to replace the back power panel.

Removing the Fill and Drain Pump – General

1. Disconnect the Thawer from the power source and drain the Thawer of all water.
2. Remove the cover (see Section *Removing the Cover*).
3. Split the top and bottom housing (see Section *Removing the Top and Bottom Chassis*).

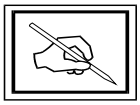
Removing the Fill Pump

1. The fill pump is the one on the right hand side.
2. Remove the two (2) straps holding the power cables to the bottom chassis.
3. Remove the snap on strap holding the pump in.

4. Follow the copper tubing from the top of the pump into the chamber and you will find a plastic strap around the copper tube. Remove the screw and strap.
5. With gentle but firm force, snap the copper tubing from the slot in the chamber and remove the pump assembly.
6. Reverse the steps to replace the fill pump.

Removing the Drain Pump

1. To remove the drain pump, you must first remove the fill pump. Follow the procedure for removing the fill pump.
2. Once the fill pump is removed, you can remove the snap on strap holding the drain pump in.
3. Locate the brass compression fitting to the right of the Thawer on the wall of the chamber. Loosen the nut on the fitting making sure the whole fitting does not move.
4. Locate the brass compression fitting on the pump. Loosen the nut and back it all the way off the threads.
5. You can now lift the pump up and out of the chassis.
6. Reverse the steps to replace the drain pump.



NOTE: If replacing a pump, remove the fittings and put them on the new one using teflon tape on the threads.

Removing the Gear Motor

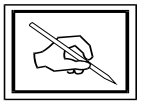
1. Disconnect the Thawer from the power source.
2. Remove the cover (see Section *Removing the Cover*).
3. Remove the quick release pin from center of slider arm.
4. Remove hairpin, plastic washer, and brass bushing from the pinion pin on the pinion wheel.
5. Gently raise the slider arm up and over the pinion pin and move to one side. Note the position of another plastic washer under the slider arm at the quick release pin position and on the pinion pin.
6. Measure the height of the pinion wheel from the plastic housing to the bottom of the pinion wheel for reinstallation.
7. Rotate the pinion wheel until you can see the Allen screw holding it to the gear motor. Back the Allen screw out enough to remove the wheel from the shaft.
8. Holding the gear motor from falling, remove the four (4) screws from the top and remove the gear motor.
9. Reverse the steps to replace the gear motor.

Servicing the Thawers — MT210

Removing the Circulation Pump

1. Disconnect the Thawer from the power source and completely drain all of the water from the Thawer, see Section *Draining the Thawer – MT210* — Chapter 5.

2. Remove the eight (8) screws holding the deck to the top of the Thawer. Also remove the single setscrew holding the manual drain knob.
3. Firmly pull the manual drain knob straight up and off its shaft. Lift and remove the deck assembly.
4. Remove the four (4) screws holding the control panel in place and carefully tilt the panel out towards you. Take note of the wire connections. With gentle but firm force, disconnect the wires from the control panel. Place the panel in a static proof bag and set it aside.
5. Remove the four (4) screws holding the back power panel in place at the rear of the Thawer. With care, remove the back power panel from the rear of the Thawer. Take note of the wire connections. With gentle but firm force, disconnect the wires from the back power panel and set it aside.
6. Remove the three (3) screws at the back lapping edge of the control console. Just inside the opening where the control panel was removed, near the center front of the control console, there is a single screw; remove this screw. The control console should lift off easily.
7. On the rear of the Thawer are two (2) waterproof compression fittings where the wires to the pumps pass from the back power panel to the fill and circulation pumps. Carefully, disconnect the compression fittings and feed the circulation pump wires back down into the chamber of the Thawer until the electrical connector reaches the fitting.

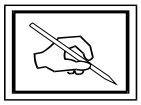


NOTE: If an “Amploc” brand electrical pin remover is available, remove the electrical connectors and pull the pump wires completely through the fitting. Otherwise, cut the connectors from the end of the wires. Be sure to do it close to the connectors, but leaving enough wire to re-connect them back.

8. Carefully, remove the four (4) screws from the corners of the agitator arm shaft blocks inside the chamber. There is one block in the front and one in the back.
9. Slide the agitator arm assembly as far into the front block as you can and pull the rear block back from the chamber wall. In the opening behind it, you will see a flat link pin assembly. This has a small spring clip retaining it on the agitator arm shaft. Remove this pin carefully and remove the agitator arm shaft from the link. Remove the agitator arm assembly and its blocks from the chamber.
10. Remove the eight (8) 7/16" bolts from the bottom of the chamber and remove the chamber.
11. In the main reservoir, there is a stainless steel chamber mount held in place by four (4) screws. Remove the screws and carefully tilt the plate to access the underside. There is a hose attached to this plate. Loosen the hose clamp and remove the plate from the Thawer.
12. Carefully remove the circulation pump from its mount and pull the wire from the track.
13. Reverse the steps to replace the circulation pump.

Removing the Fill Pump

1. Disconnect the Thawer from the power source and completely drain all of the water from the Thawer (see Section *Draining the Thawer – MT210* — Chapter 5).
2. Remove the eight (8) screws holding the deck to the top of the Thawer. Remove the single setscrew holding the manual drain knob.
3. Firmly pull the manual drain knob straight up and off its shaft. Lift and remove the deck.
4. Remove the four (4) screws holding the control panel in place and carefully tilt the panel out towards you. Take note of the wire connections. With gentle but firm force, disconnect the wires from the control panel. Place the panel in a static proof bag and set it aside.
5. Remove the four (4) screws holding the back power panel in place at the rear of the Thawer. Remove the back power panel from the rear of the Thawer with care. Take note of the wire connections. With gentle but firm force disconnect the wires from the back power panel and set it aside.
6. Remove the three (3) screws at the back lapping edge of the control console. Just inside the opening where the control panel was removed, near the center front of the control console, is a single screw; remove this screw. The control console should lift off the Thawer with ease.
7. On the rear of the Thawer there are two (2) waterproof compression fittings where the wires to the pumps pass from the back power panel to the fill and circulation pumps. Carefully disconnect the compression fittings and feed the fill pump wires back down into the chamber of the Thawer until the electrical connector reaches the fitting.



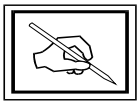
NOTE: If an “Amploc” brand electrical pin remover is available, remove the electrical connectors and pull the pump wires completely through the fitting. Otherwise, cut the connectors from the end of the wires. Be sure to do it close to the connectors, but leaving enough wire to re-connect them back.

8. Carefully remove the four (4) screws from the corners of the agitator arm shaft blocks inside the chamber. There is one block in the front and one in the back.
9. Slide the agitator arm assembly as far into the front block as you can and pull the rear block back from the chamber wall. In the opening behind it, you will see a flat link pin assembly. This has a small spring clip retaining it on the agitator arm shaft. Remove this pin carefully and remove the agitator arm shaft from the link. Remove the agitator arm assembly and its blocks from the chamber.
10. Remove the eight (8) 7/16" bolts from the bottom of the chamber and remove the chamber.
11. In the main reservoir of the Thawer, there is a stainless steel chamber mount. This is held in place by four (4) screws. Remove the screws and carefully tilt the plate to access the underside. There is a hose attached to this plate. Loosen the hose clamp and remove the plate from the Thawer.

12. Carefully remove the mounting screws on the fill pump and remove it from its mount.
13. Loosen the hose clamp and remove the hose from the pump, then install it on the new pump.
14. Reverse the steps to replace the fill pump.

Removing the Heater

1. Turn the power OFF and disconnect the Thawer from the power source.
2. Completely drain all of the water from the Thawer (see Section *Draining the Thawer – MT210* — Chapter 5).
3. Remove the eight (8) screws holding the deck to the top of the Thawer. Remove the single setscrew holding the manual drain knob.
4. Firmly pull the manual drain knob straight up and off its shaft. Lift and remove the deck assembly.
5. Remove the four (4) screws holding the control panel in place and carefully tilt the panel out towards you. Take note of the wire connections. With gentle but firm force disconnect the wires from the control panel. Place the panel in a static proof bag and set it aside.
6. Remove the four (4) screws holding the back power panel in place at the rear of the Thawer. Remove the back power panel from the rear of the Thawer with care. Take note of the wire connections. With gentle but firm force disconnect the wires from the back power panel and set it aside.
7. Remove the three (3) screws at the back lapping edge of the control console. Just inside the opening where the control panel was removed, near the center front of the control console, there is a single screw; remove this screw. The control console should easily lift off the Thawer.
8. On the rear of the Thawer there are two (2) waterproof compression fittings where the wires to the pumps pass from the back power panel to the fill and circulation pumps. Carefully disconnect the compression fittings and feed the two (2) pump wires back down into the chamber of the Thawer until the electrical connector reaches the fitting.



NOTE: If an “Amploc” brand electrical pin remover is available, remove the electrical connectors and pull the pump wires completely through the fitting. Otherwise, cut the connectors from the end of the wires. Be sure to do it close to the connectors, but leaving enough wire to re-connect them back.

9. Carefully uncover the heater terminals and disconnect the wires. Remove the large brass nuts and set the wire harness aside.
10. Carefully remove the four (4) screws from the corners of the agitator arm shaft blocks inside the chamber. There is one block in the front and one in the back.
11. Slide the agitator arm assembly as far into the front block as you can and pull the rear block back from the chamber wall. In the opening behind it, you will see a flat link pin assembly. This has a small spring clip retaining it on the agitator arm shaft. Remove this pin carefully and

remove the agitator arm shaft from the link. Remove the agitator arm assembly and its blocks from the chamber.

12. Remove the eight (8) 7/16" bolts from the bottom of the chamber and remove the chamber.
13. Remove the four (4) screws holding the gear motor to the Thawer and remove the gear motor. Remove the six (6) other screws visible on the deck around the gear motor mount. Lift this deck from the Thawer allowing the heater terminals to slip through the fittings and out.
14. In the main reservoir of the Thawer, there is a stainless steel chamber mount. This is held in place by four (4) screws. Remove the screws and carefully tilt the plate to access the underside. There is a hose attached to this plate. Loosen the hose clamp and remove the plate from the Thawer.
15. Carefully, pull the heater standoffs from their mounts and work the heater up and out of the Thawer.
16. Remove the standoffs from the old heater and with firm force, place the new standoffs on the replacement heater and locate them at the same point where they were on the old heater. Place the new heater in the chassis and firmly force the standoffs back into their bases.
17. Place a rubber and a brass washer on each terminal.
18. Replace the Motor Mount Deck over the heater terminals and secure it.
19. Place another rubber and brass washer on each terminal. Do not forget to place the ground lug terminal of the heater harness on one of the terminals between the brass washer and the nut.
20. Place the brass nuts on the terminals and tighten until the assembly is snug and secure.
21. Reverse the steps to replace the heater.

Removing the Back Power Panel

1. Turn the power OFF and disconnect the Thawer from the power source.
2. Remove the four (4) screws holding the back power panel in place at the rear of the Thawer.
3. Carefully remove the back power panel. Take note of the wire connections. With gentle but firm force, disconnect the wires from the back power panel and set it aside.
4. Reverse the steps to replace the back power panel.

Removing the Control Panel

1. Turn the power OFF and disconnect the Thawer from the power source.
2. Remove the four (4) screws holding the control panel in place (they are centered on each side of the panel) and carefully tilt the panel towards you. Take note of the wire connections.
3. With gentle but firm force, disconnect the wires from the control panel. Place the panel in a static proof bag and set aside.
4. Reverse the steps to replace the control panel.

Chapter 8
Parts List

TABLE OF CONTENTS

Parts List – MT202 8-1

Parts List – MT204 8-2

Parts List – MT210 8-3

ThermoLine™ Thawing System MT202 Parts List

Ordering Information

Please contact Helmer Technical Service for information about ordering parts or service:
Toll Free: 743.5637 (U.S./Canada)
Direct: +1.317.773.9092
Fax: +1.317.773.9082
Email: service@helmerinc.com

Please Note:
Parts that are ordered but not listed here are considered a "Special Order" and are subject to availability and variable pricing. Although we will do everything in our power to expedite delivery there could be a lead time of **up to 6 weeks** to receive these parts. In the event that you frequently order parts not on this list we highly encourage you to maintain a small stock at your facility.

Part Description	Part Number
Base Gasket	2-42-012
Control Panel	7-51-011
Drain Hose	7-21-034
Drain Snap	7-27-014
Fuse, 2A	1-27-042
Fuse, 4A	1-27-048
Gear Motor (110V)	7-65-050
Gear Motor (220V)	7-65-051
Heater Element (110V)	6-26-007
Heater Element (220V)	6-26-008
Heater Harness	7-34-122
High Vacuum Grease	5-41-005
Keypad Membrane	1-61-008
Level Sensor Harness	7-34-010
Level Sensor Screw	2-13-067
On/Off Breaker Switch	1-27-020
Operator and Service Manual	6-07-042
Pocket (10.5" length)	7-47-003
Pocket (9.5" length)	7-47-072
Pocket Repair Kit	7-01-002
Pocket Weights	7-61-001
Power Panel (110V)	7-51-021
Power Panel (220V)	7-51-022
Pump Replacement Kit (110V)	70009
Pump Replacement Kit (220V)	70011
Strain Relief Fitting	1-46-023
Tapping Balls, 1"	6-55-183
Tapping Rod	6-54-001
Thermal Fuse	7-32-001
Thermo Tube Boot	7-47-039
Water Conditioning Liquid	5-34-002

Parts List — MT204

ThermoLine™ Thawing System MT204 Parts List

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Part Description	Part Number
Base Gasket	2-42-010
Control Panel	7-51-039
Drain Hose	7-21-034
Drain Snap	7-27-014
Float Switch	7-00-103
Fuse, 12.5A	1-27-079
Fuse, 2A	1-27-042
Gear Motor (110V)	7-65-109
Gear Motor (220V)	7-65-110
Heater Element (110V)	6-26-009
Heater Element (220V)	6-26-010
Heater Harness	7-34-121
High Vacuum Grease	5-41-005
Keypad Membrane	1-61-008
Level Probe *(for models produced before February 27, 2003)*	7-37-037
Level Probe Harness *(for models produced before February 27, 2003)*	7-34-012
Level Sensor Harness *(for models produced after February 27, 2003)*	7-34-010
Level Sensor Screw *(for models produced after February 27, 2003)*	2-13-067
On/Off Breaker Switch	1-27-020
Operator and Service Manual	6-07-042
Pocket, One Liter (12.5" length)	7-47-008
Pocket, Standard (11.5" length)	7-47-004
Pocket (10.5" length)	7-47-071
Pocket Repair Kit	7-01-002
Pocket Weights	7-61-001
Power Panel, Black (11OV)	7-51-023
Power Panel, Black (220V)	7-51-024
Pump Replacement Kit (110v)	70009
Pump Replacement Kit (220v)	70011

Continued on next page

ThermoLine™ Thawing System MT204 Parts List
Continued

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Part Description	Part Number
Strain Relief Fitting	1-46-023
Tapping Balls, 1"	6-55-183
Tapping Rods	6-54-001
Temp Probe	7-21-031
Thermal Fuse	7-32-001
Thermo Tube Boot	7-47-039
Water Conditioning Liquid	5-34-002

Parts List — MT210

ThermoLine™ Thawing System MT210 Parts List

Ordering Information

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Toll Free: 800.743.5637 (U.S./Canada)
Direct: +1.317.773.9092
Fax: +1.317.773.9082
Email: service@helmerinc.com

Part Description	Part Number
1” x 2” Nipple	4-64-006
Control Panel	7-51-079
Coupling (Alum)	2-64-001
Drain Hose	7-21-048
Fill Pump Assembly (with hose)	7-33-003
Flapper Valve	4-36-044
Fuse, 16A	1-27-062
Fuse, 3.15A	1-27-041
Gear Motor	7-65-111
Heater Element	1-16-006
Keypad (White)	1-61-008
Level Probe	7-37-002
Level Probe Harness	7-34-010
On/Off Breaker Switch	1-27-020
Operator and Service Manual	6-07-042
Pocket, One Liter (12.3” length)	7-47-008
Pocket (11.5” length)	7-47-004
Pocket (10.5” length)	7-47-071
Pocket Repair Kit	7-01-002
Pocket Weights	7-61-001
Power Panel	7-51-025

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Pump Hose	4-43-015
Pump Hose Adapter (for units purchased after March 9, 2001)	4-61-044
Pump Hose Clamp (for units purchased after March 9, 2001)	2-24-072
Pump, Circulating. Replacement Kit	70015
Pump Replacement Kit	70010
Pump Strap	7-26-003
Reducer End Fittings (required for pump hose replacement)	4-69-007
Slider Link	6-14-011
Strain Relief Fitting	1-46-023
Tapping Balls, 1”	6-55-183
Tapping Rods	6-14-005
Temp Probe	7-21-033
Thermal Fuse	7-32-005
Thermo Tube Boot	7-47-039
Water Conditioning Liquid	5-34-002

Chapter 9
Reference Drawings

TABLE OF CONTENTS

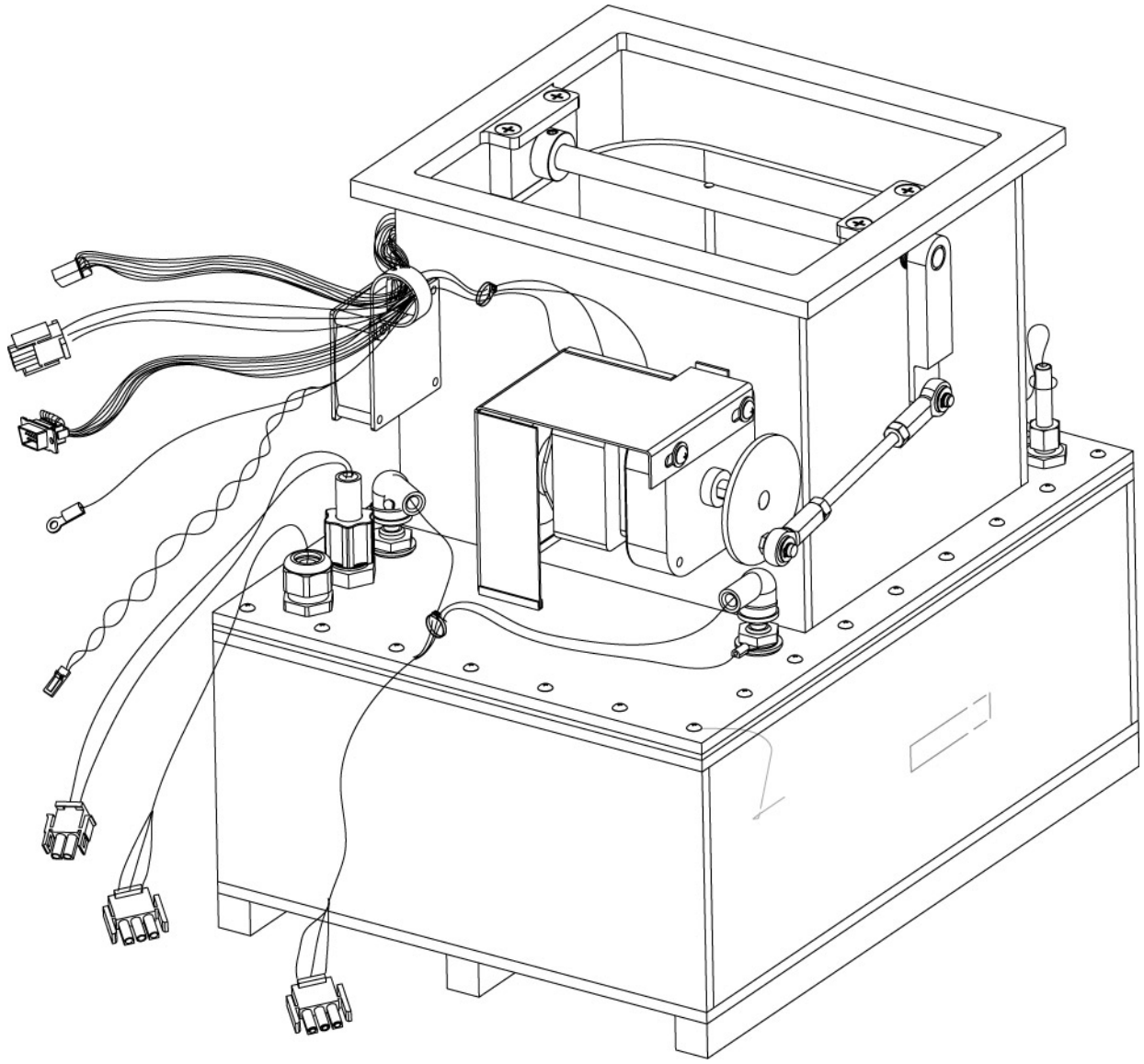
Drawings – MT202 9-1

Drawings – MT204 9-5

Drawings – MT210 9-11

MT202 Drawings

7-45-097, 1 of 2



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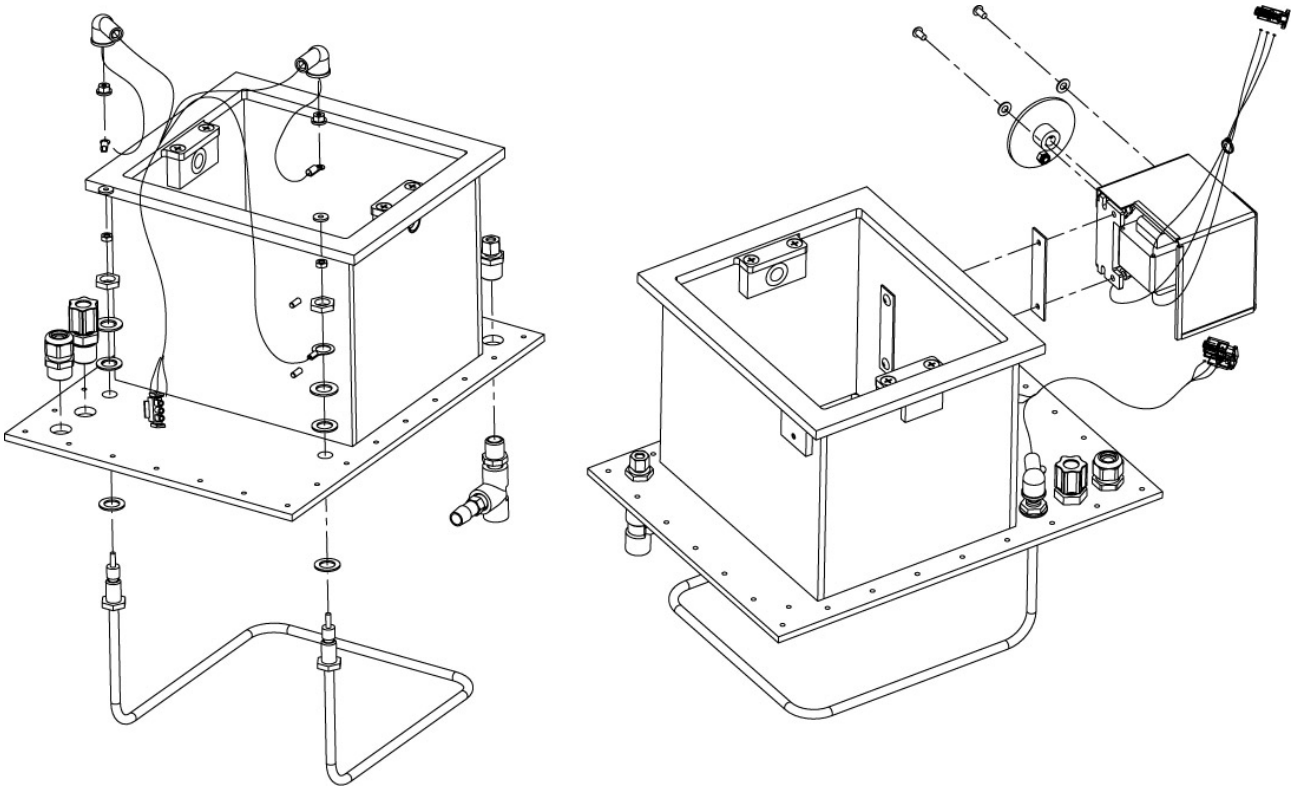

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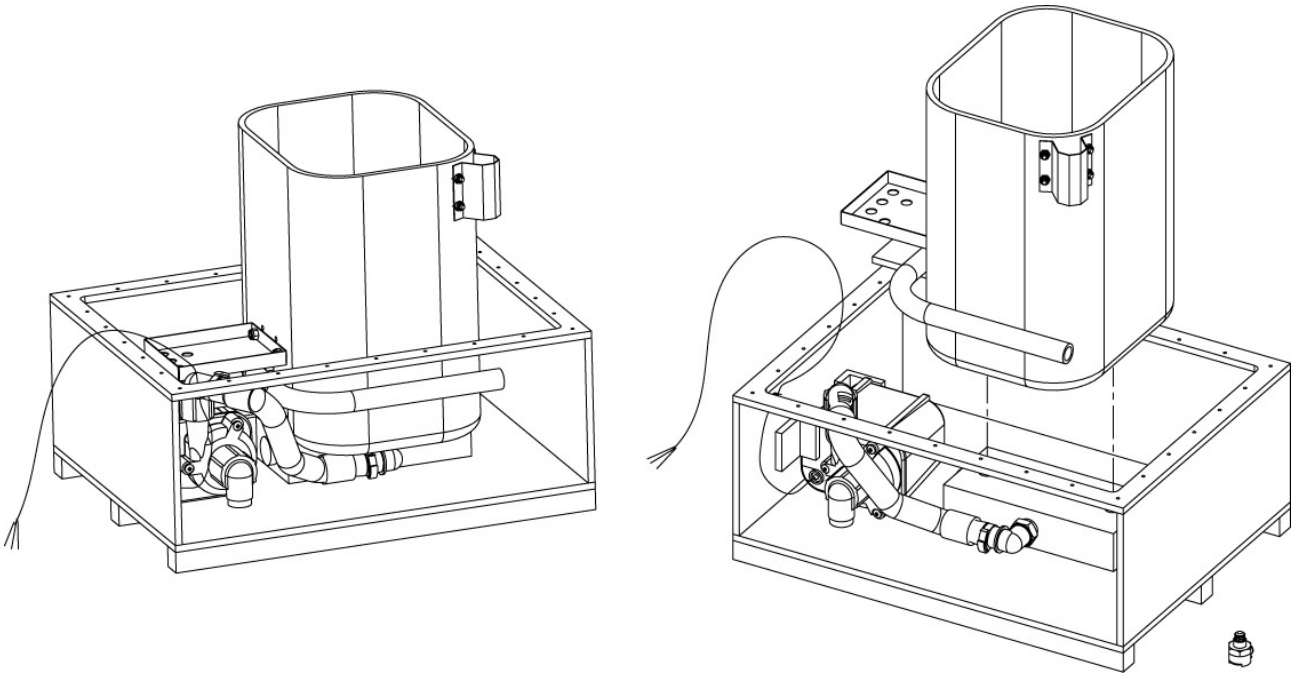

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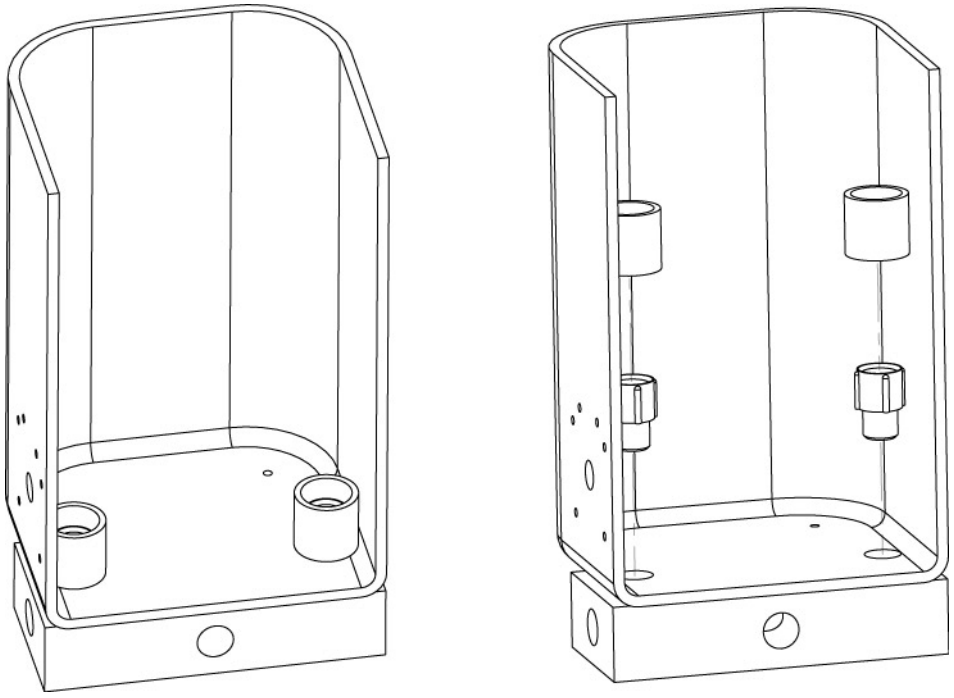

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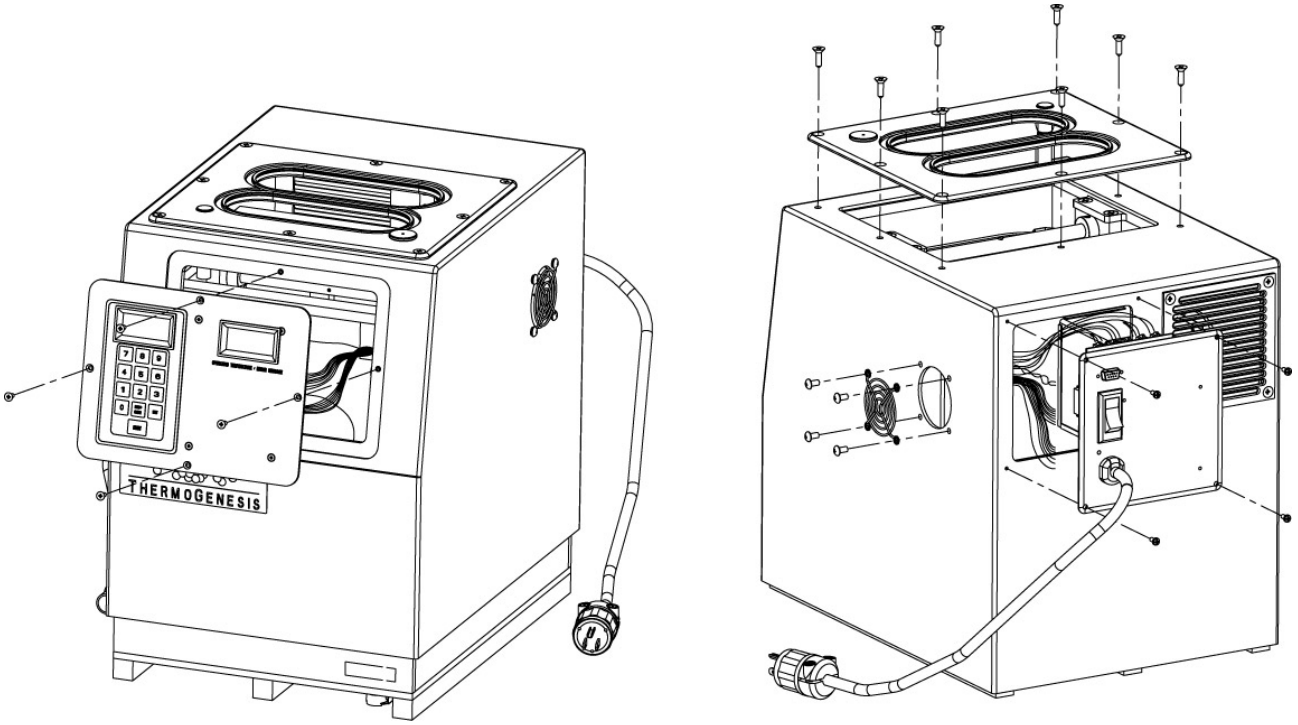

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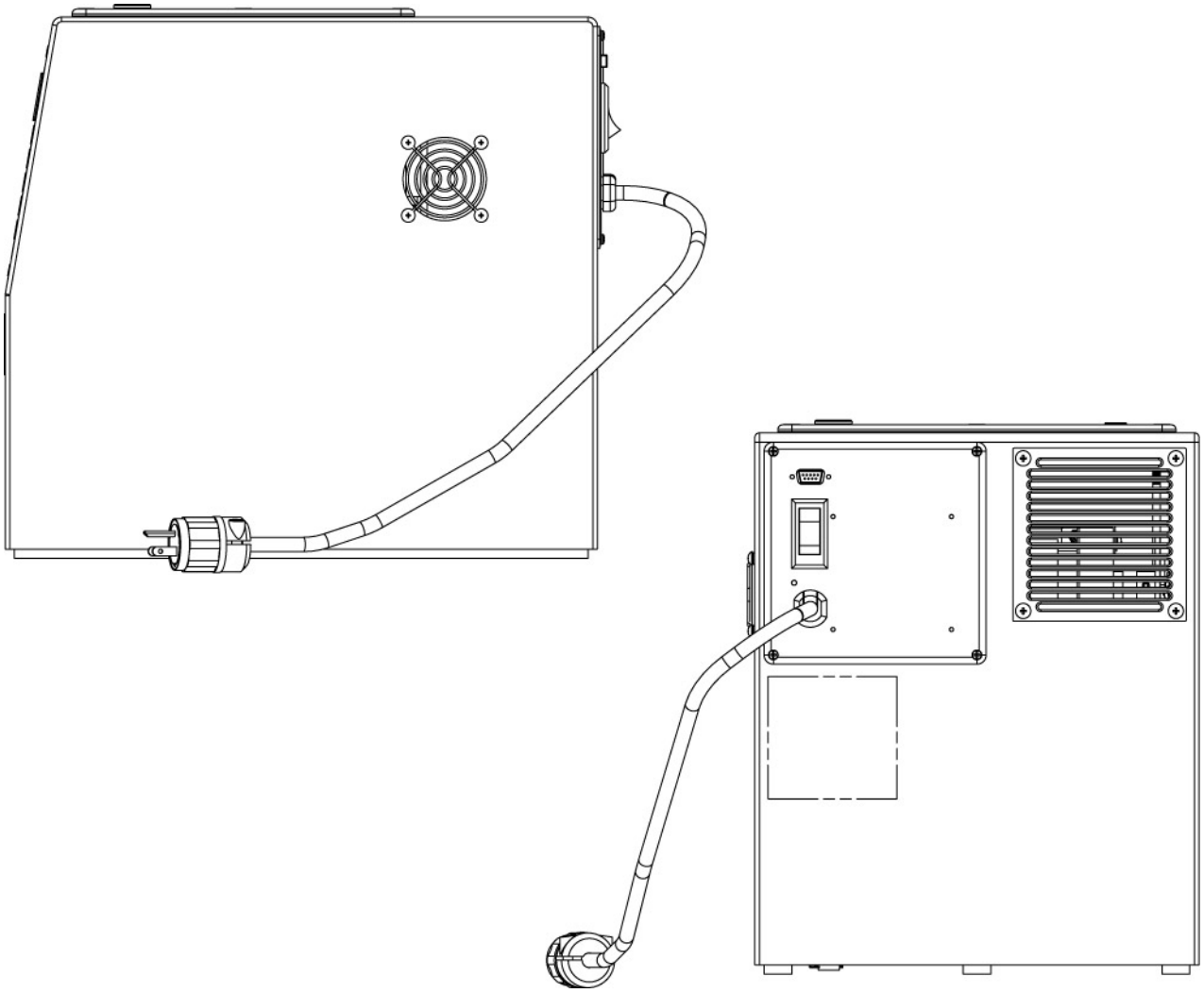

MT204 Drawings

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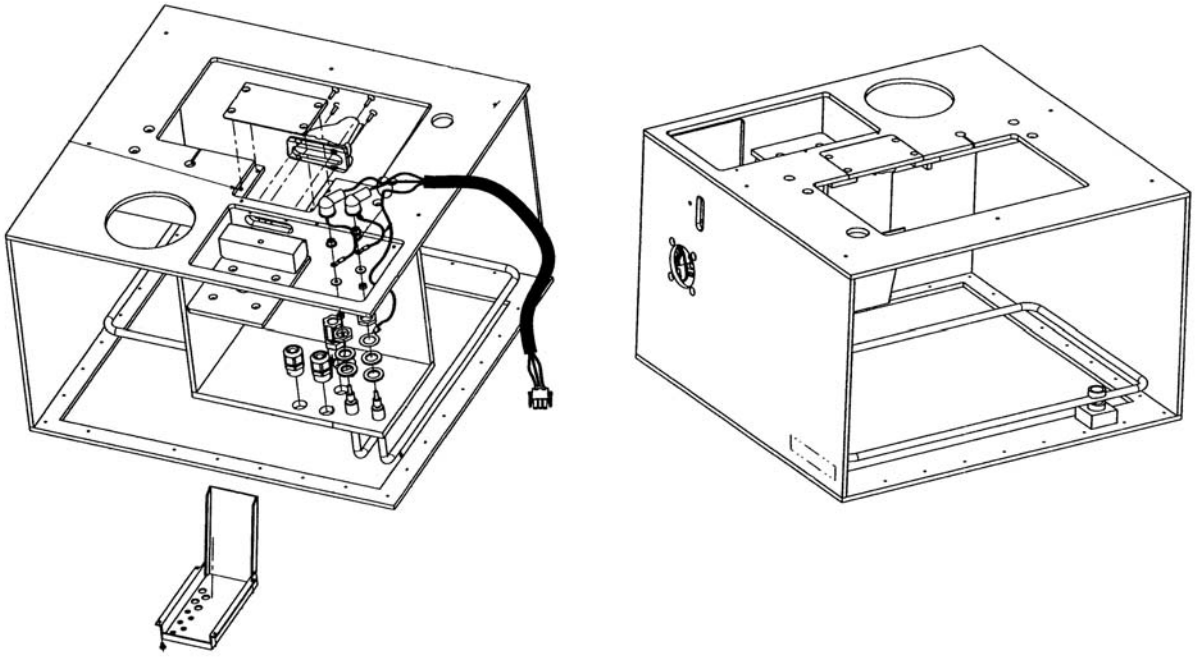

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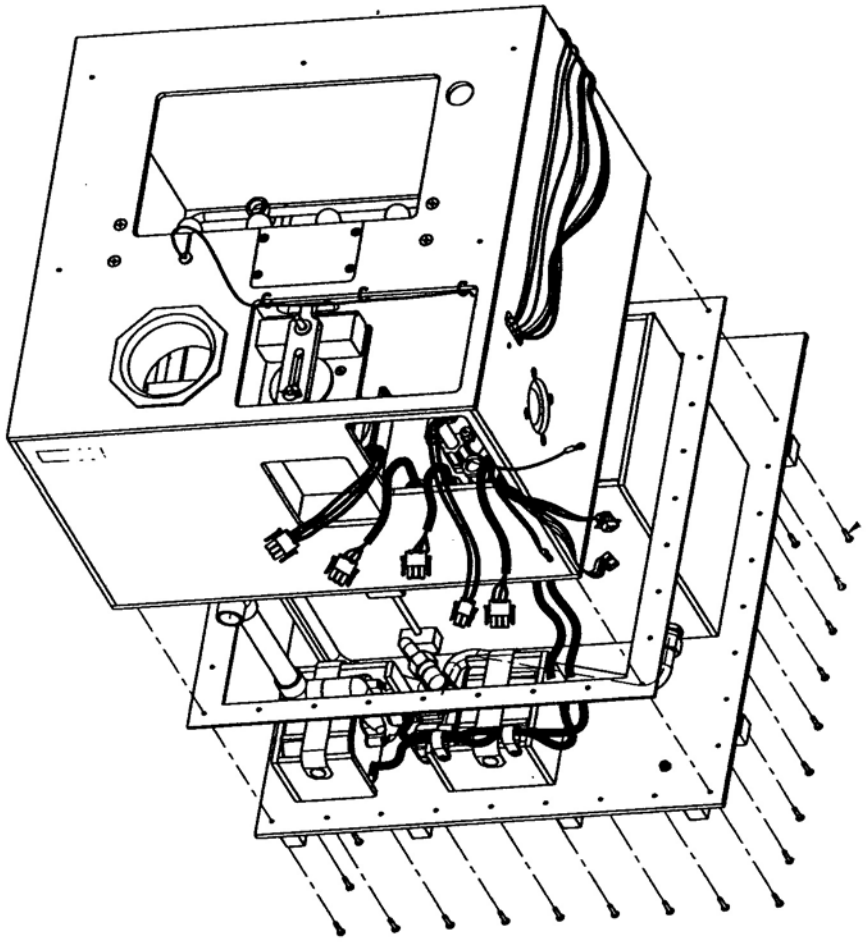

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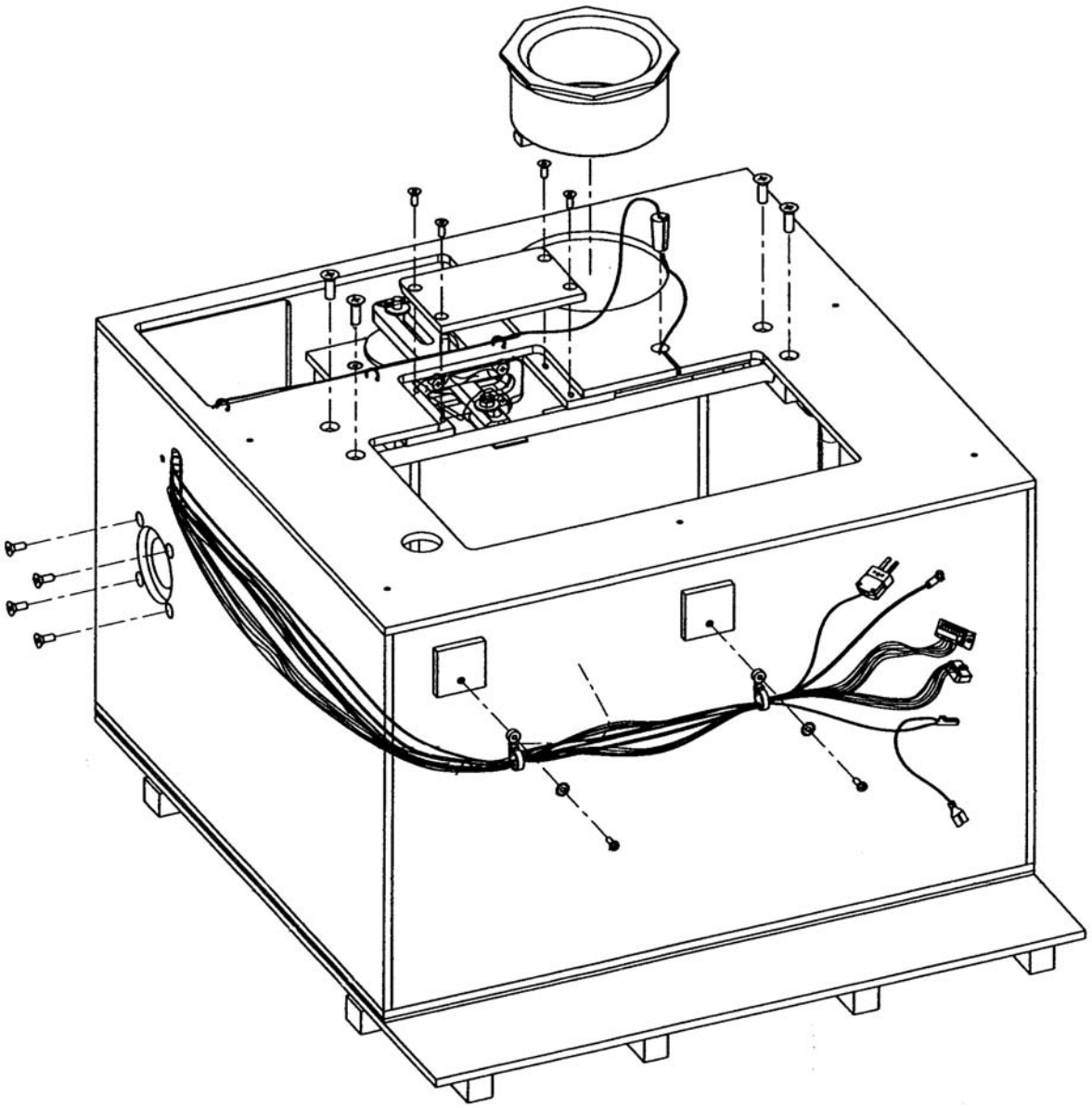

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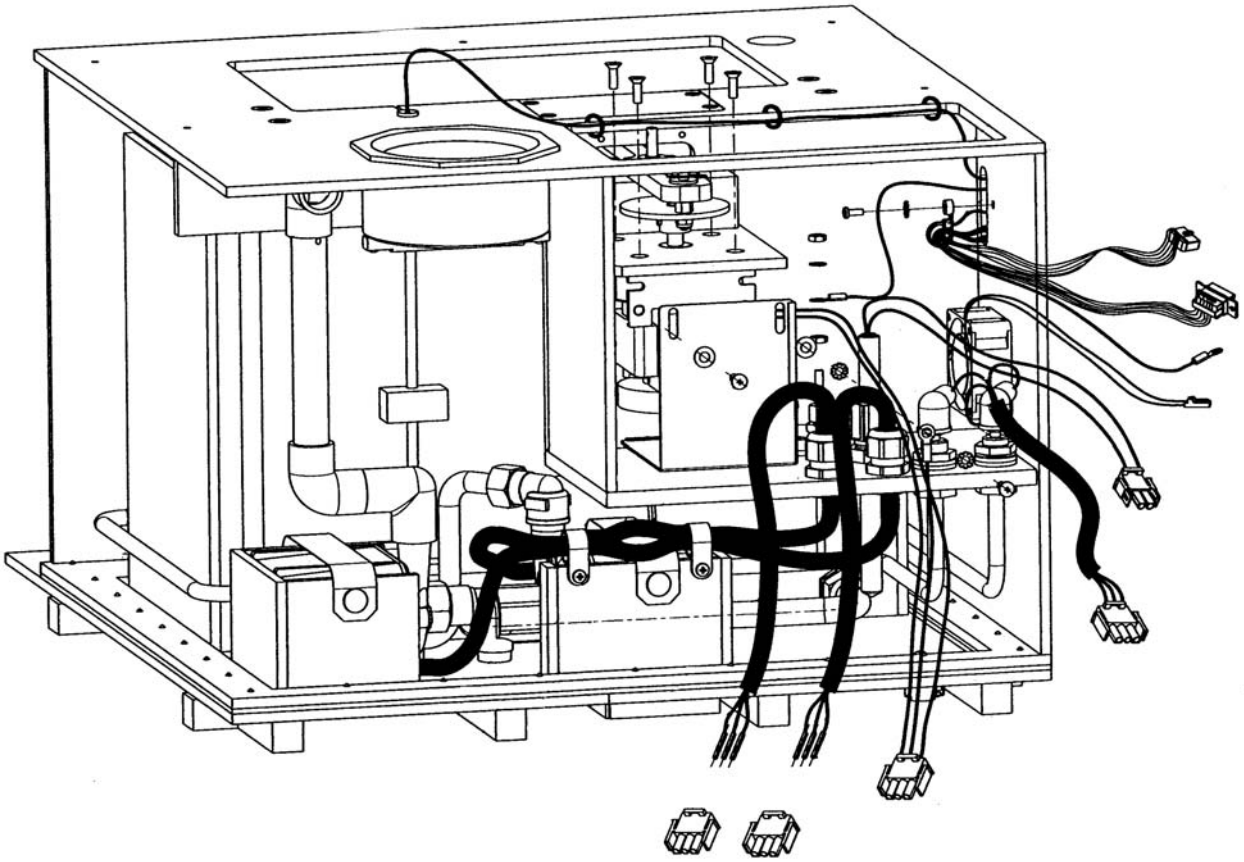

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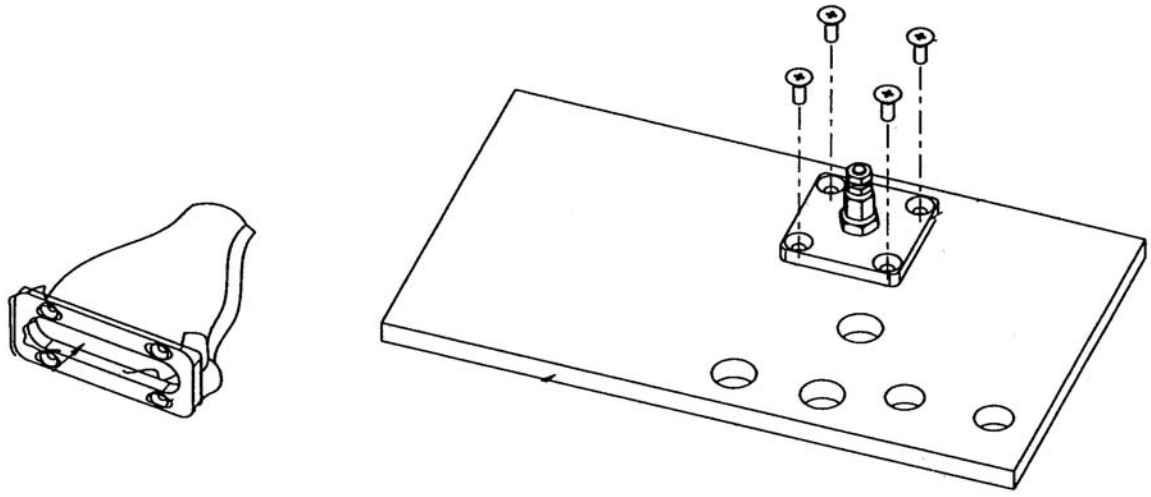
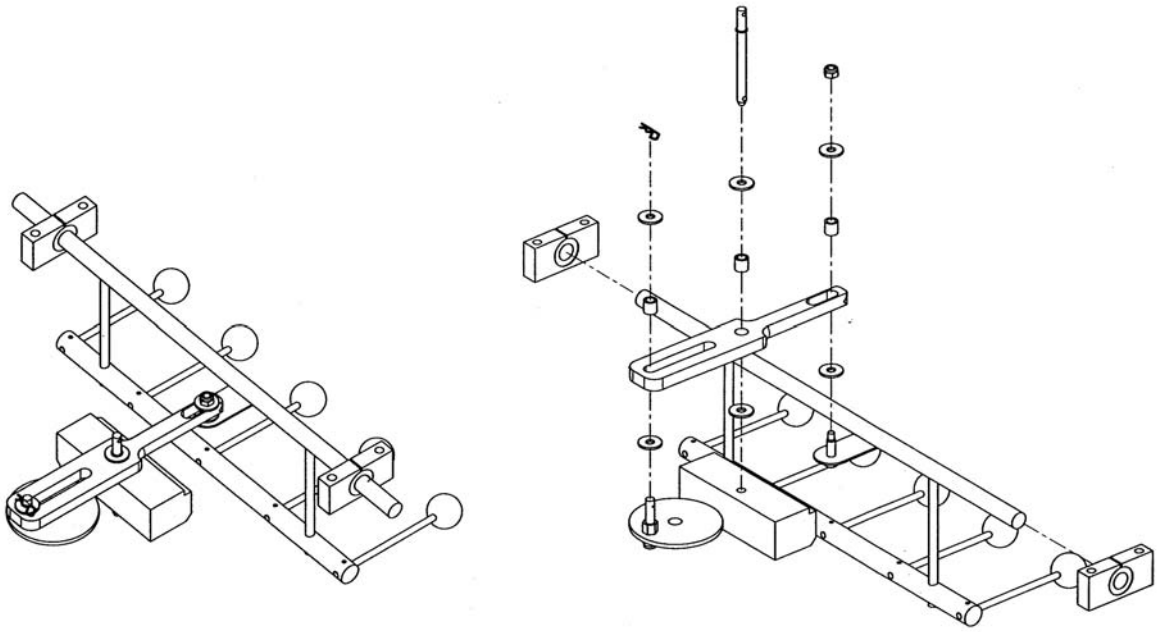


7-45-074, 5 of 5



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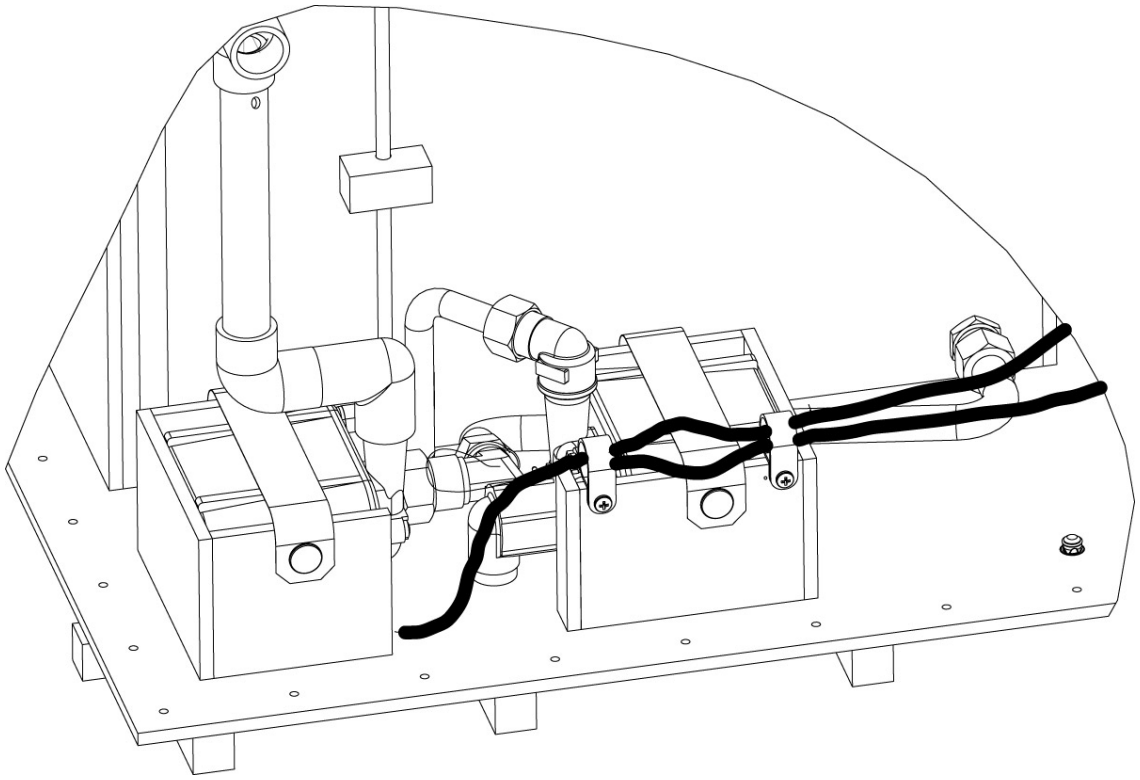
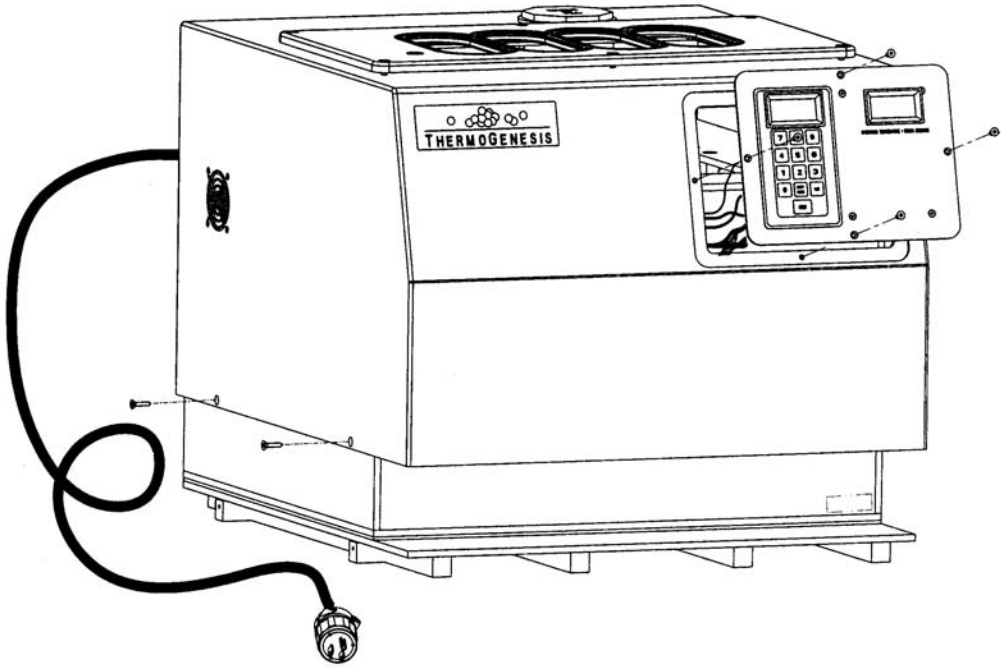


7-51-038, 2 of 5



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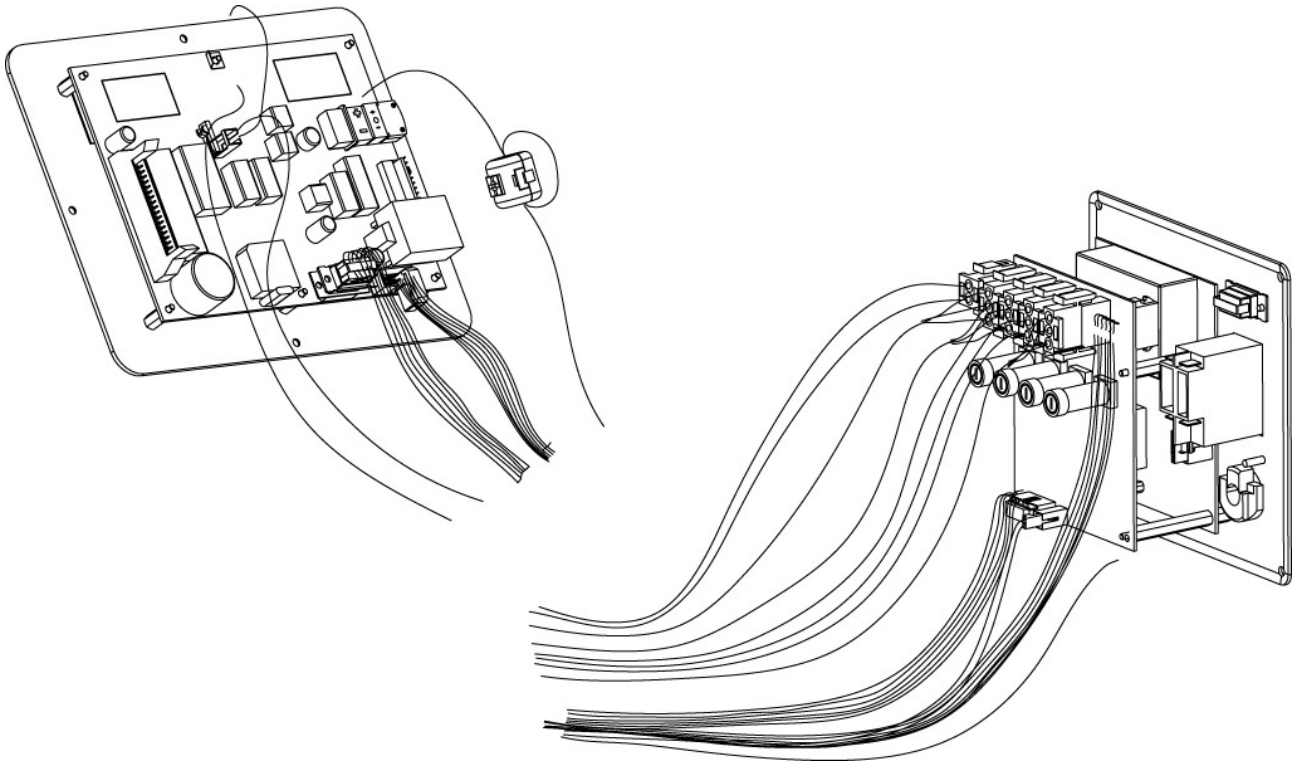
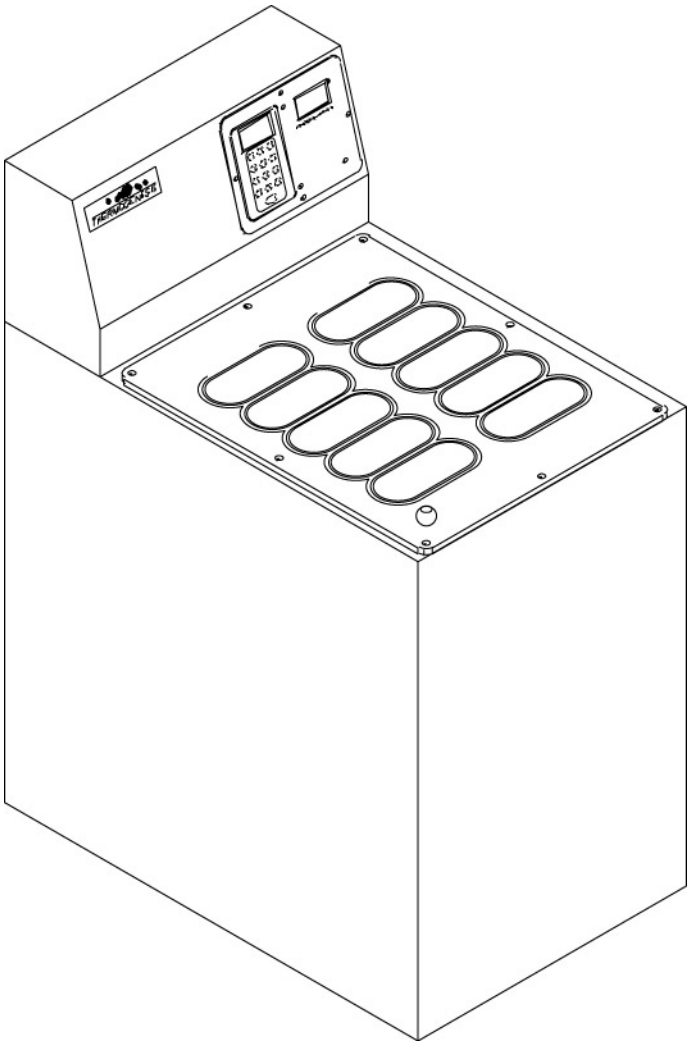


MT210 Drawings

7-51-080, 1 of 4



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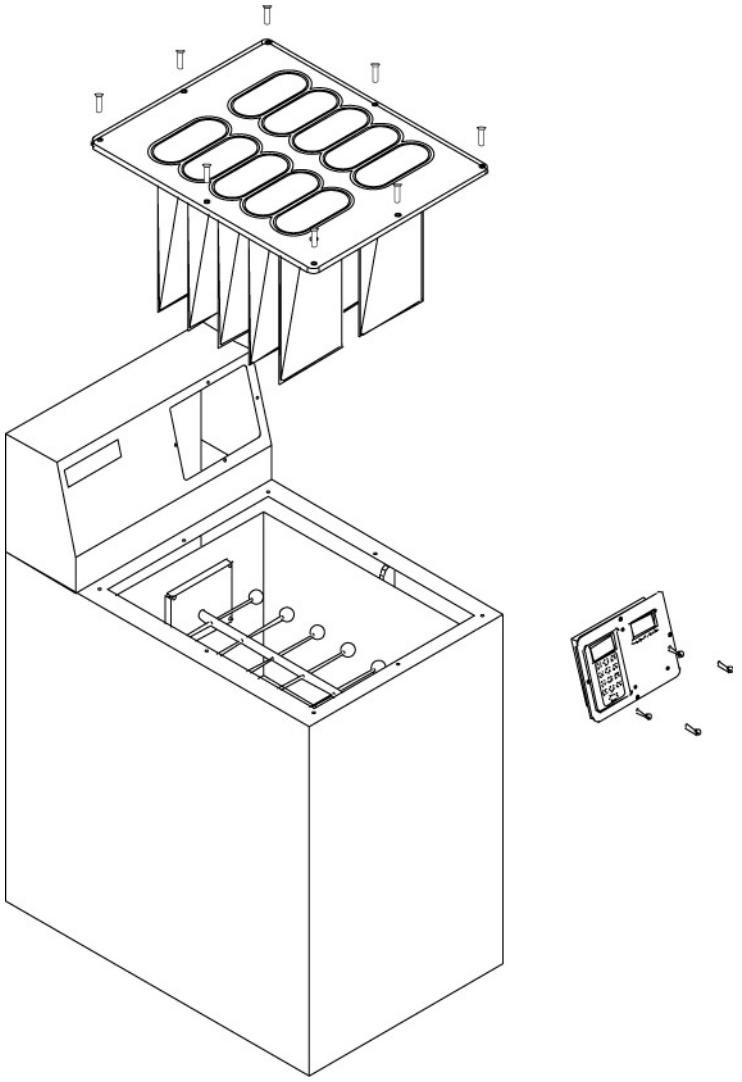

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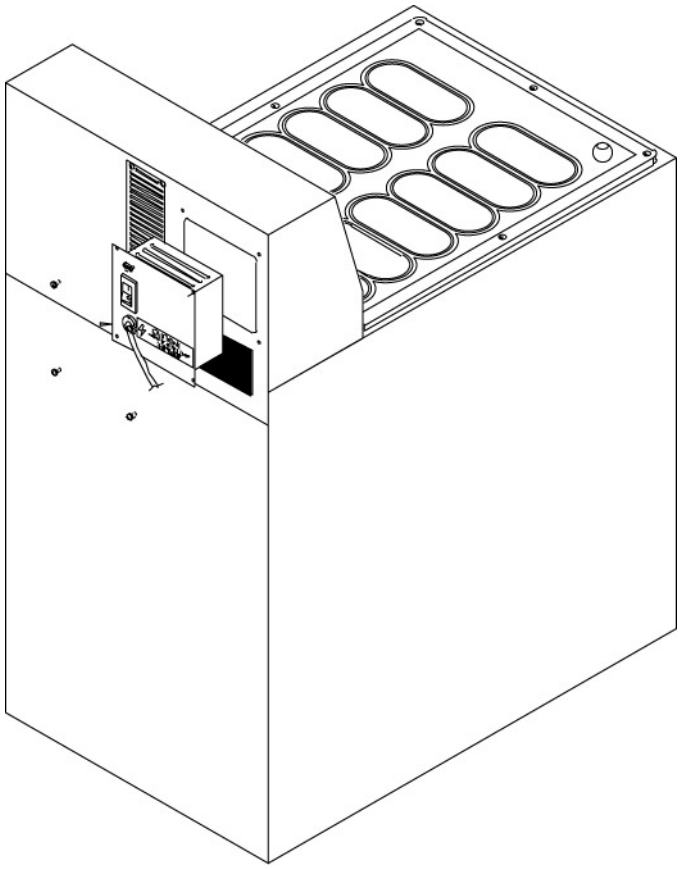

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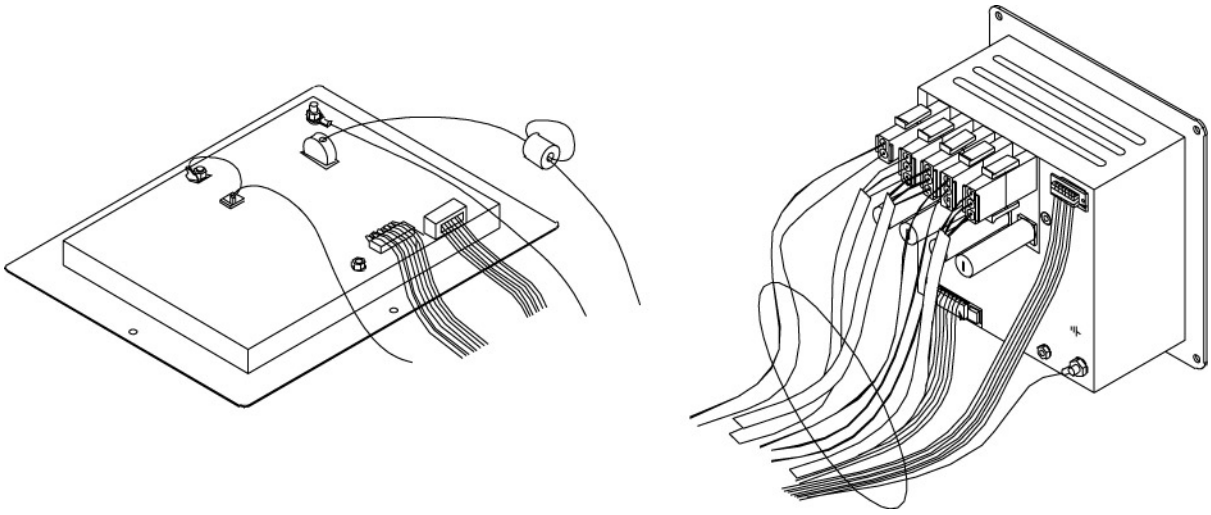

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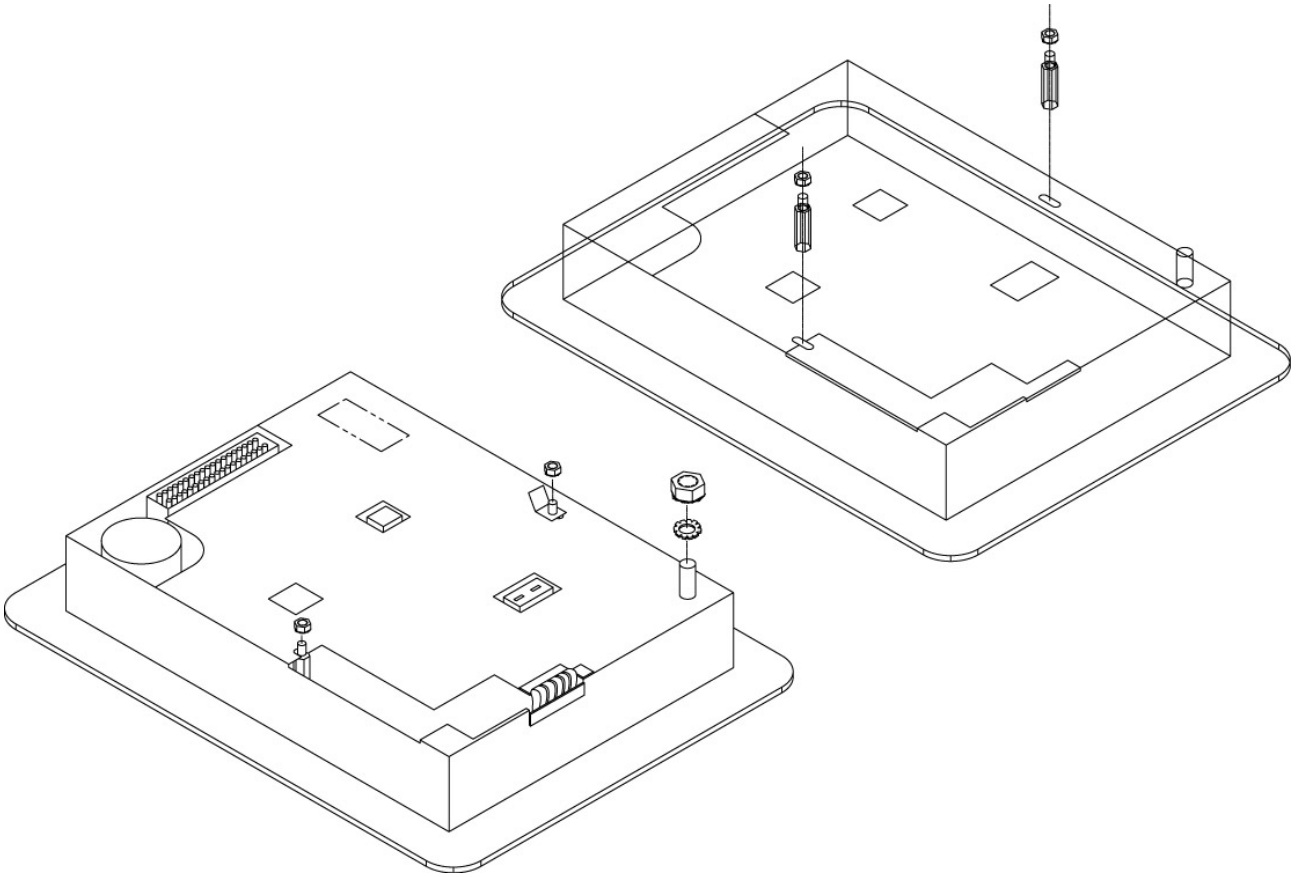

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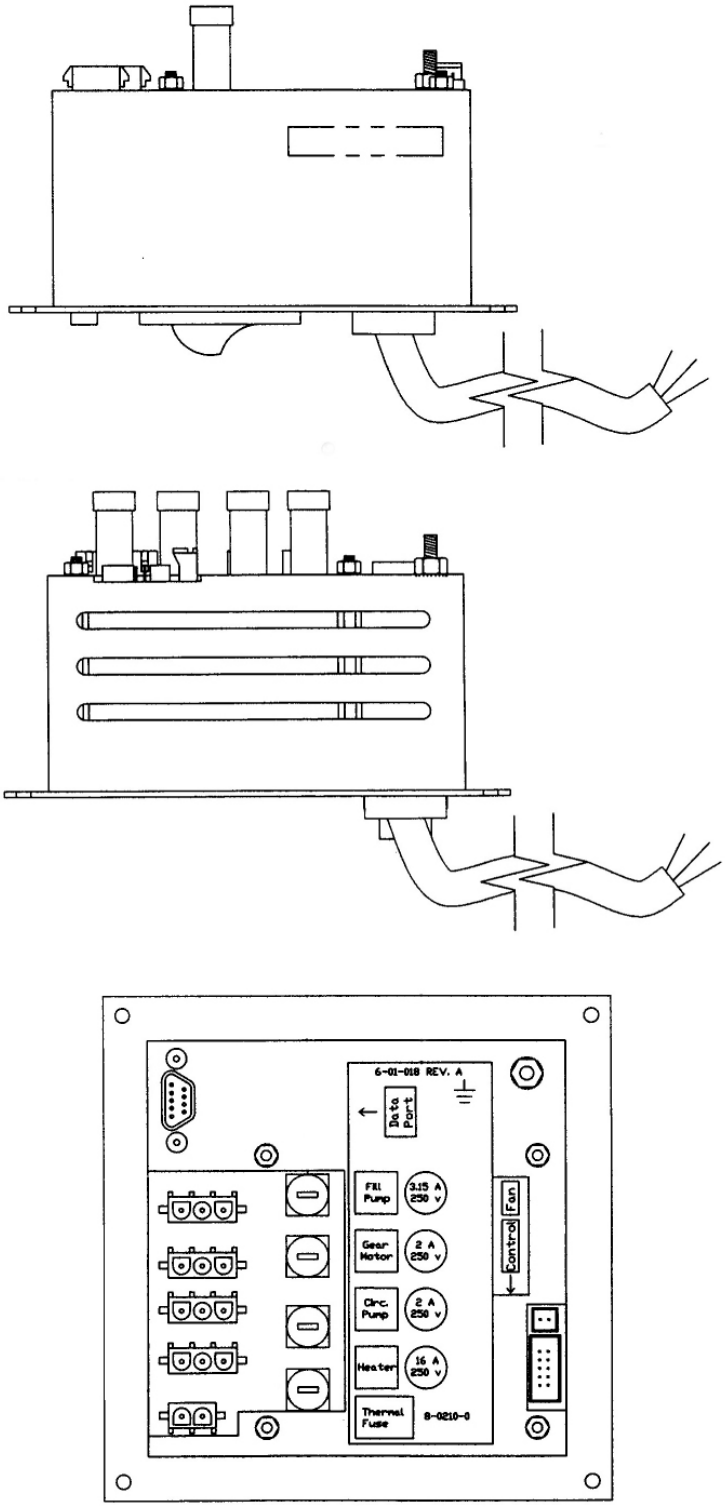
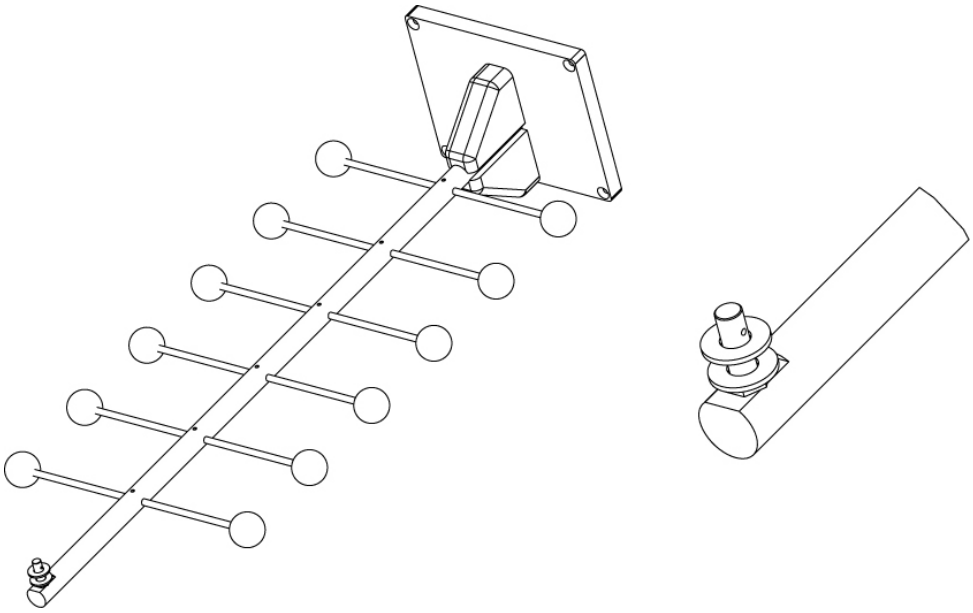
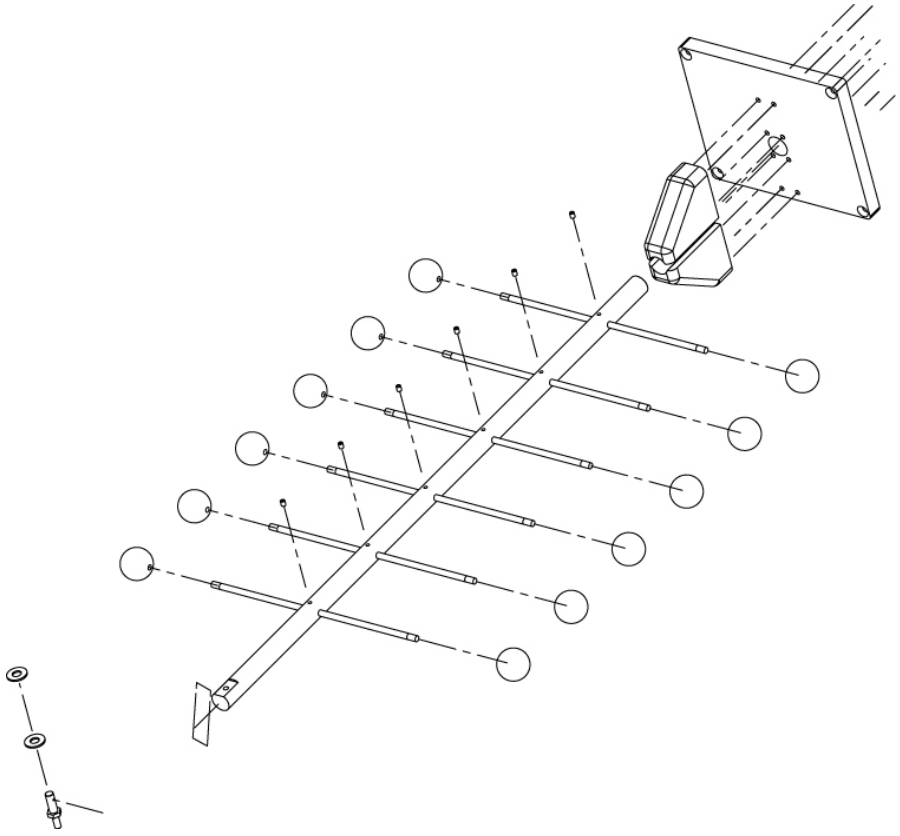

6-01-018 REV. A
Data Port
Fill Pump
3.15 A 250 V
Gear Motor
2 A 250 V
Circ. Pump
2 A 250 V
Heater
16 A 250 V
Thermal Fuse
8-0210-0
Fan
Control

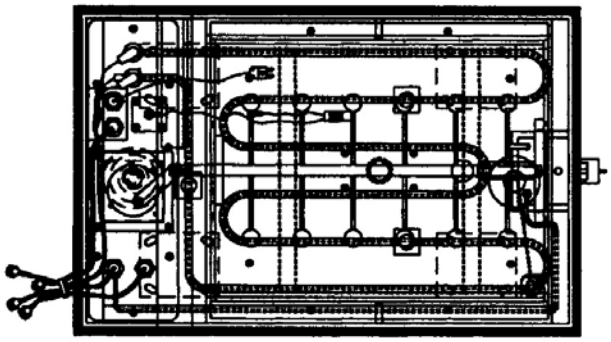
7-46-032, 1 of 2

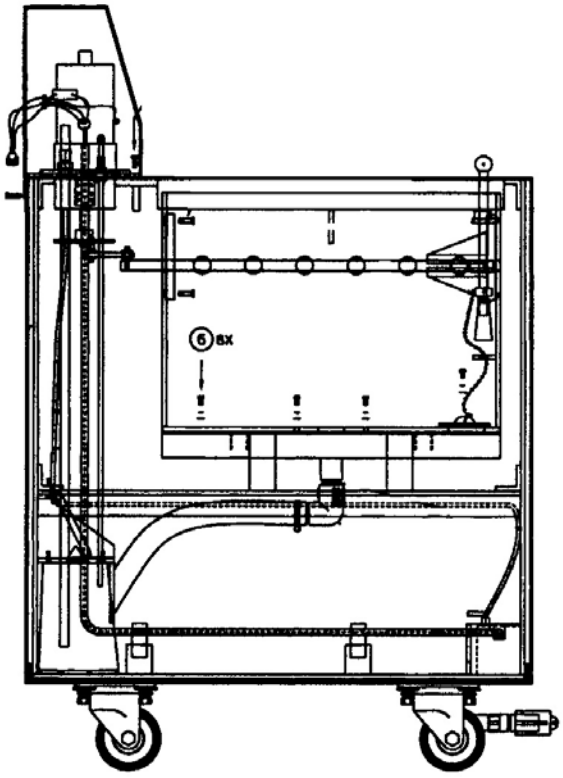


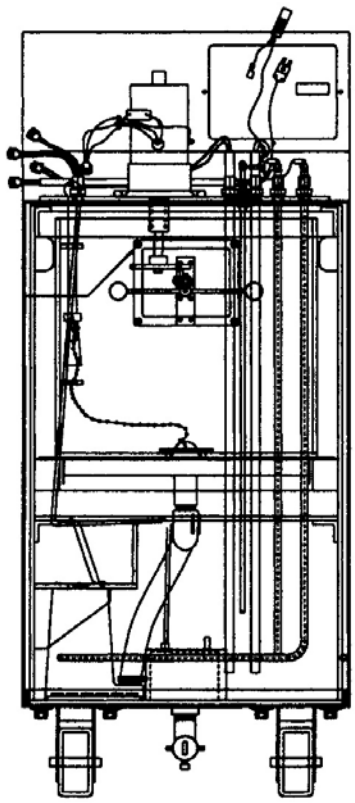
7-46-032, 2 of 2



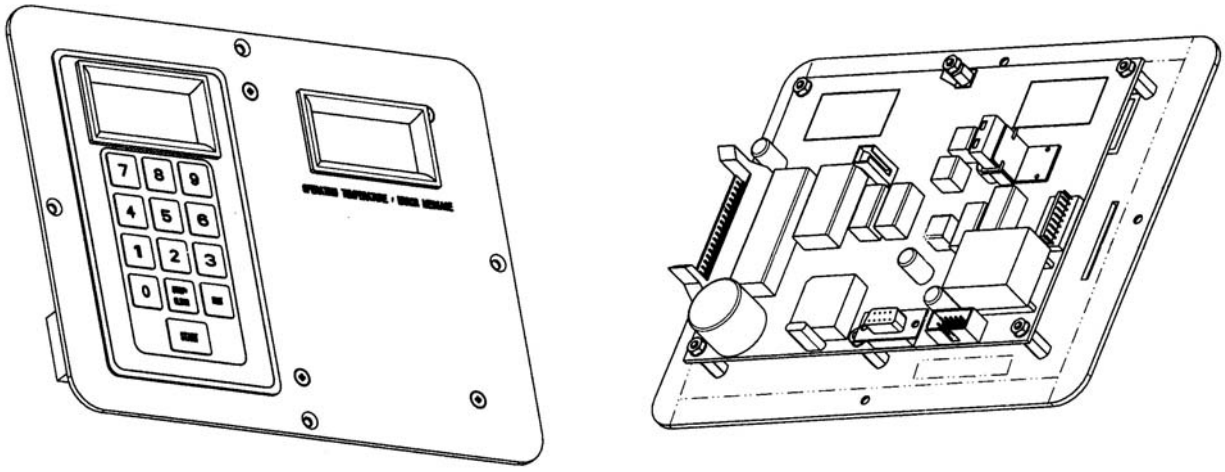
7-45-026, 2 of 2







7-35-010, 1 of 2



7-35-010, 2 of 2